

April 27, 2009

Formation of Invention/Joint Invention and Recognition of Inventor/Joint Inventor

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1. Introduction

In studies including (A) formation of an invention and recognition of an inventor¹, and relating to (B) formation of a joint invention and recognition of a joint inventor², I have identified criteria for recognition of an inventor/joint inventor, and reviewed recognition, based on these criteria, of a joint inventor in three court decisions.³ Then, I considered, applying the criteria stated above, in what circumstances a person who proposed a research theme can be deemed as an inventor.⁴ Further, in my study (C) I considered such problems of criteria that had not been sufficiently considered in studies (A) or (B).⁵ Hence study papers (A), (B) and (C) form the author's basic standards for recognition of an inventor and a joint inventor.

This piece aims to bring together and rearrange the discussion in the three studies ((A) to (C)) and add some

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¹ Kotaro Kageyama, *Recognition of Inventor and Contribution of Patented Inventions to Corporate Earnings - Also Relating to Employee Invention-*, 56(6) Chizai Kanri. 831 (2006).

² Kotaro Kageyama, *Formation of Invention/Joint Invention and Recognition of Inventor/Joint Inventor - Including Review on Conventional Two-step Process until Formation of Invention -*, 66(6) Chizai Purizumu. 1 (2008).

³ Kotaro Kageyama, *Formation of Invention/Joint Invention and Recognition of Inventor/Joint Inventor and Review based on them on Related Court Decisions*, 886 NBL. 65 (2008).

⁴ Kotaro Kageyama, *Presentation of Research Theme, Formation of Invention and Recognition of Inventor*, 73(7) Chizai Purizumu. 36 (2008).

⁵ Kotaro Kageyama, *Formation of Invention/Joint Invention and Criteria and Method for Recognizing Inventor/Joint Inventor*, 76(7) Chizai Purizumu. 51 (2009).

revisions. It also aims to refer to as many laws and court decisions on patent law etc. as possible relating to formation of an invention and recognition of an inventor in Japan.

This study mainly discusses ① formation of an invention and criteria for recognition of an inventor; ② formation of a joint invention and criteria for recognition of a joint inventor; ③ how to recognize an inventor/joint inventor; and ④ court decisions relating to recognition of a joint inventor. With respect to ③, as one viewpoint to recognize the inventor, I will further propose the categories "physical-object invention" and "material invention," in connection with the possibility of distinguishing a "conception based on a principle" and "establishment of a model" and the difficulty in anticipating the latter based on the former. However, discussions made in other parts of this study are unaffected even if such categorization is not adopted.

As to the issue of joint inventor, Professor Mary LaFrance⁶ of Nevada University has discussed its definitions

⁶ Mary LaFrance, *A Comparative Study of United States and Japanese Laws on Collaborative Inventions, and the Impact of those Laws on Technology Transfers*, (Institute of Intellectual Property 2005).

Further, it discusses in detail about the right of joint inventors and wrong identification of joint inventors, etc.

Its summary was also published on the basis of "Report on Industrial Property Study Promotion Project." (Mary LaFrance, *A Comparative Study of United States and Japanese Laws on Collaborative Inventions, and the Impact of those Laws on Technology Transfers*, Chizai Kenkyu Kiyou. 72 (2005))

To supplement definition/recognition of a joint inventor in this study, unlike professor LaFrance's definition/recognition in the US., I have (i) further analyzed "conception" and "reduced to practice" indicated by

in court decisions etc. in her article about patent systems in US and Japan. While this study provides more detailed considerations than her study in terms of, for instance, (a) stages of formation of an invention and (b) objective/subjective aspects of a joint invention, Professor LaFrance asserts that the US and Japan apply very similar concepts and criteria and experience similar problems⁷, relating to the concept of an inventor and criteria for recognition of a joint inventor. Thus I presume that the discussion in this study will be sufficiently useful also in the US and other countries.

It seems that clear criteria to recognize a joint

professor LaFrance with respect to the formation stages of an invention and extracted "conception based on a principle" and "establishment of a model," (ii) analyzed recognition of an inventor when an invention is made through experiments; and (iii) considered subjective aspects/objective aspects of a joint invention and classified joint inventions into direct type and indirect type.

Analysis of the kind of (i) and (ii) has not yet been done in the following court decisions etc. relating to formation of an invention cited by professor LaFrance's study indicated above.

① *Hybritech, Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 1376 (Fed.Cir.1986); ② *Oregon Health & Sci.Univ. v. Vertex Pharmaceuticals, Inc.*, 233 F.Supp.2d 1282, 1289 (D.Or.2002).

But in *Monsanto Co.v.Kamp*, 269 F.Supp.8 18, 824 (D.D.C.1967) which is cited in professor LaFrance's study paper, the court required a joint invention to be "the product of the collaboration of the inventive endeavors of two or more persons working together toward the same end and producing an invention by their aggregate efforts." Whether a common purpose is required with a joint invention is not clear with Japanese court decisions, and this study paper considers subjective aspects of joint invention and carries out analysis/consideration as in (iii) above.

⁷ Mary LaFrance, *supra* note 6, at Chapter I-B.

inventor have not been established in the US,⁸ and objective/subjective aspects of a joint invention and the classification of directly-involved joint invention and indirectly-involved joint invention have not been introduced.

This study also proposes that reasonable criteria for recognizing an inventor should be established, that assessment of his/her achievements based on these reasonable criteria is necessary, and that researchers and engineers should receive proper treatment based on such assessment.

Finally, while efforts are being made to soothe the current turmoil in the economy and society triggered by uncontrolled financial capital, I hope this study, which aims at proper evaluation of research and development, will contribute to a platform for restructuring the economy and society based on tangible, especially technological, development.

⁸ See, ① W. Fritz Fasse, *The Muddy Metaphysics of Joint Inventorship: Cleaning up After the 1984 Amendments to 35 U.S.C. §116*, 5 Harv. J. L. & Tech. 153 (1992). Fasse quoted: "The exact parameters of what constitutes joint inventorship are quite difficult to define. It is one of the muddiest concepts in the muddy metaphysics of the patent law..." (*Mueller Brass Co. v. Reading Industries, Inc.* 352 F. Supp. 1357 (E.D. Pa. 1972)).

② Joshua Matt, *Searching for an Efficacious Joint Inventorship Standard*, 44 B.C.L.Rev.245 (2002) Matt said: "...In patent law, joint inventorship is a notoriously slippery concept..."

③ Tigran Guledjian, *Teaching the Federal Circuit New Tricks: Updating the Law of Joint Inventorship in Patents*, 32 Loy. L. A. L. Rev. 1273 (1999).

④ Philip Konecny, *Windfall Property Rights for the Left Out Co-Inventor Who Gets Let into the Patent*, 16 Santa Clara Computer & High Tech. L. J. 141 (1999).

Guledjian and Konecny mainly focused on the relation between joint inventors and joint owners.

2. Formation of Invention and Criteria for Recognition of Inventor

(2.1) Stages of Formation of Invention

(1) Meaning of Invention

The Japanese Patent Law defines that "an invention shall mean highly advanced creation of technical ideas utilizing the laws of nature."⁹ (Article 2(1) of Patent Law) The laws of nature mean laws in the natural world typically such as principles of physics and chemistry.

Although the key terms in the definition of an invention indicating the scope of an invention are "laws of nature," "technical ideas" and "creation," it seems that relevant previous cases have considered "technical ideas" and "creation" only, rarely discussing clearly the element of "laws of nature." To ultimately understand what "technical ideas" exists in an invention, one needs to know "the laws of nature," that is, the "principle" which is used in the invention. The "principles" are as discussed above, but their scope may be construed in a flexible way and principles of a very basic level may satisfy the requirements.

(2) Stages of Formation of Invention and Specific Examples

⁹ In contrast, a "device" defined in utility model law is "creation of technical ideas utilizing the laws of nature," eliminating "highly-advanced." (Article 2(1) of Utility Model Law) With respect to a utility model, the required level (of inventiveness) is lower than a patent. Under utility model system an application used to be registered after examination as "a petty patent." Since January 1994, however, all utility model applications have been registered, one needs to obtain a "Utility Model Search Report" from the Patent Office to enforce his/her right. Such a report is issued after substantive requirements are examined and evaluated at the Patent Office. See also, (4.2) (2) regarding devices.

In the case of an invention of an airplane, ① purpose of invention (problem to be solved) and ② stages of formation of an invention can be identified as follows (① is the stage before ②. See (2.4)):

Figure 1

"A model is established" based on a "conception based on a principle." Conversely, the principle contained in the model can be read from the model.¹⁰

(3) Distinctive structural Elements

An inventor may be identified not only with a horizontal chronological approach exploring the stages of formation of an invention, but also with a vertical approach evaluating the importance of the structural elements a, b, c, ... of the invention of which the contents of the invention (technical scope) consist.

The approach may be graphically shown in the following figure:

Figure 2

When two or more persons are involved, an inventor is a person who was involved in the distinctive structural elements of the invention, because the invention is a creation

¹⁰ Formation of patents can be considered from (a) the chronological viewpoint and/or (b) the viewpoint of looking back through existing technologies. For instance, the sentence before "Conversely" has the viewpoint of (a) and afterwards has the viewpoint of (b). Also description relating to "distinctive" in (2.1)(3) has viewpoints (a) before "while wheels are not" and (b) after "Arguments."

of technical ideas. An element being distinctive means that the element makes a distinctive contribution to the effect of the invention, compared with conventional technology. In the case of the invention of the airplane, wings, propellers and power unit are distinctive, while wheels are not. Arguments on distinctive structural elements are sometimes made from the viewpoints of whether they are not publicly known (novel) (Article 29(1) of Patent Law for reference) and have inventiveness (Article 29(2) of Patent Law for reference). These viewpoints are considered as patentability.¹¹

(2.2) Criteria for Recognition of Inventor

In (2.1), what is technically most significant are "establishment of a model" in the process of embodying a concept and the "conception based on a principle" in the process of proposing the concept.

Their significance in connection with the purport of a patent system and the object to be protected under the system may be explained as follows.

Since the patent system "aims for ... development of industries" (Article 1 of Patent Law), establishing a model which is industrially applicable is the most important, while a conception based on a principle is also important because

¹¹ Novelty and inventiveness are, with the possibility for use in industry, requirements for patent in Japan. "Distinctive structural elements" of a patented invention are basically indicated in claims and detailed description of invention is referred to as necessary.

the object to be protected is technical ideas (which use laws of nature).

The following may be construed from the abovementioned definition of invention.

Because an invention is a creation of technical ideas, establishment of a model is naturally the most important, while the conception based on a principle is also important because an invention is a creation using laws of nature.

"The scope of patent claims" (claim) is the essence of the technical ideas which have been created, and is derived by rearranging the model from the viewpoint of technology and rights.

In principle, therefore, the person who was involved in distinctive structural elements and contributed to either establishment of a model or the conception based on a principle should be recognized as the inventor. (Generally, these are the criteria for recognition of an inventor)¹²

¹² The late Kousaku Yoshifuji (hereinafter referred to as Yoshifuji), who was Japan Patent Office (hereinafter referred to as "JPO") patent appeal board director/ examination division director and authority of the field, divided invention formation process into (a) proposal of concept (conception); and (b) embodiment of the concept (Kousaku Yoshifuji, Tokkyo-ho Gaisetsu 188 (Ken'ichi Kumagai ed., 13th ed. Yuhikaku 1998)).

Some court decisions also cited above Yoshifuji's theory. However, "conception" and especially "embodiment of a concept" are a little too abstract especially with respect to recognition of an inventor. Hence it would be appropriate to analyze those elements and extract the essence which is a "principle" or "reproducible phenomenon"((2.3)(3)Ⓞ) instead of principle for conception or a "model" for embodiment of a concept. Making, contribution to either of the two viewpoints, standards will allow clearer discussion. This constitutes the start point of the author's

(2.3) Considerations of Stages of Formation

Here I consider each stage of formation of an invention.

(1) Mere Intuitions and Conceptions based on a Principle in Conception

A concept can be distinguished into either (i) a mere intuition or (ii) conception based on a principle, firstly because since an invention uses laws of nature, an intuition that does not take into account a principle should not be deemed as an effective concept, and secondly because a person who merely talked about an intuition should be denied to be an inventor.¹³

(2) Utilization of Laws of Nature and Conception based on a Principle

With respect to recognition of an inventor, a court decision declared that "an inventor must at least be either one who had a new concept or one who realized the embodiment of the concept," and that a new concept "must be something more than a mere intuition; it must specifically identify a problem to be solved and a method or means of its solution, and should

theoretical system, relating to formation of invention/joint invention and recognition of inventor/joint inventor. The author believes that "conception" and "reduced to practice" indicated as the requirement of completion of patented invention in the US court decisions ① and ② as cited in note 6 are not satisfactorily specific.

The author's theory is different from Yoshifuji's theory which is cited above, in construction of "conception" and other points (See supra note 2, at 13-16 for observation on Yoshifuji's theory).

¹³ A "mere intuition" includes even the conception which does not reach a principle.

be something to be conceptualized as an idea related to technology."¹⁴ This decision is consistent with this study in that it required a new concept to be "something more than a mere intuition."

Nonetheless the part of the decision that a new concept must "specifically identify ... and be something to be conceptualized as an idea related to technology" may be extremely simply put as "conception based on a principle" for the following reasons.

Firstly, the definition of an invention requires "technical ideas" to "use laws of nature," and "laws of nature" means "principles" as described above. Secondly, "principle" has a narrower meaning and is more clearly defined than "idea." "Something to be conceptualized as an idea related to technology" as stated in the above-referenced court decision, is harder to understand.

Many other court decisions did not refer to "a principle" in recognizing an inventor but this factor should be included in the criteria for recognition of an inventor.

(3) Principle and Reproducible Phenomenon

① "A principle" may satisfactorily be replaced by "a reproducible phenomenon"¹⁵ for the following reasons.

¹⁴ 1943 Hanrei Jihō 85 (Tokyo D. Ct., Jan. 26, 2006). Whether an employee invention was also a joint invention was disputed.

¹⁵ Although reproducible phenomenon can be found in technical literature, it is usually shown through experiments. However, hints for direction of

An invention (a patent) is also established when there is certainty that repeated implementation of a technology always brings about a certain effect, instead of when the principle is elucidated. This is because a law of nature (principle) in its wide meaning may include a natural correlation since it is a law in the natural world.

In this respect, Mr. Yoshifuji argues that "as long as it is proved with certainty even without logic that a certain purpose can be achieved by a certain means, it is indisputable that the purpose is achieved using laws of nature as a result," and that "in the natural world, empirical thing in which a certain cause results in a certain effect (empirical rule) is also deemed as a law of nature."¹⁶

Accordingly it is construed that "conception based on a principle" which is a stage in the formation of an invention can satisfactorily be replaced by "discovery and proposal of a reproducible phenomenon." ("Discovery" may be broadly construed.)¹⁷

Based on the foregoing, the following relationships

experiments are often found in technical literature etc.

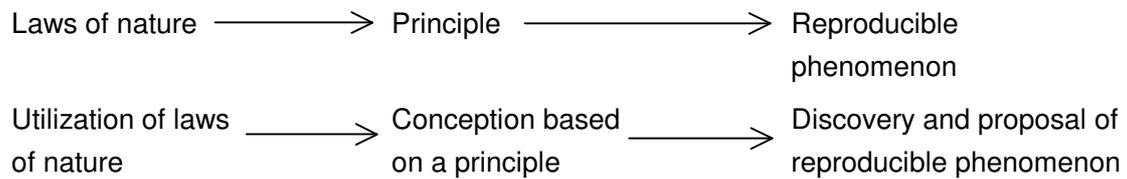
¹⁶ See Yoshifuji, *supra* note 12, at 52-54.

See also, JPO ed. *Shinsa-kijun no Tebiki* (Guide for Examination Standards) 44 (13th ed. Hatsumei-kyokai (Japan Institute of Invention and Innovation) 1979).

There it can also be referred: "A matter which does not happen repeatedly does not use laws of nature."

¹⁷ Here the term "discovery" is not used in a strict sense, rather it can be broadly construed to mean that a phenomenon which has not been well known to solve the problem is found and paid attention to.

apply.



In practice, experiments rather than a principle are often indicated. It is supposed that this is because the principle is hard to understand, or may be else because (a) a wrong principle can result in rejection of a patent application or invalidation of a patent; and (b) an invention with a simple, clear principle can sometimes be deemed as lacking in inventiveness.

② In actual research and development involving various experiments, a principle is first set to achieve a purpose (problem to be solved), based on which experiments are carried out to achieve a certain phenomenon. If they do not lead to an expected result, the principle is reevaluated and a new or modified principle is set, and experiments based on such principle are carried out. Repeating this process will lead to a reproducible phenomenon and effective results.

In its decision on September 12, 2006, Tokyo District Court noted that "although most resin composition research is carried out after a certain theory or principle is set first, finally the research cannot dispense with trial-and-error-based experiments where combinations of various components are actually done. Compositions with a desired property are

mostly obtained through such processes."¹⁸

③ Here I have used the term "reproducibility (reproducible phenomenon)" rather than repeatability etc. The reason, why it seems more appropriate, is that the term "reproducible" is more suited to use with "phenomenon," and because compared to "repeatability" (repeating), "reproducibility" takes the viewpoint of (experiment) results.

(4) Reproducible Phenomenon in Experiments

① Integration of Conception based on a Principle and Establishment of a Model

If a reproducible phenomenon is identified (even though it can not be explained from original principles), under certain experimental conditions (such as raw materials, temperature, pressure, agitation speed) while the process described in (3)② above, that is, principle → experiment → principle → experiment..., is repeated, and if a substance (product) having an effect is obtained, it means that a patentable matter have been found. The product and the experimental condition settings in such case constitute "establishment of a model" and the reproducible phenomenon is an alternative to a "principle." Sometimes the true "principle" is found later.¹⁹ That is to say, in an invention

¹⁸ 1985 Hanrei Jihō 106 (Tokyo D. Ct., Sep.12,2006); 1234 Hanrei Taimuzu 182. Whether the employee invention is also deemed as a joint invention was disputed.

¹⁹ In the academic world, studying the principle (mechanism) is important

of a product, a result-product of an experiment constitutes establishment of a model, while in an invention of a method for producing a product, the experimental condition settings constitute establishment of a model.²⁰

The system may be graphically shown as follows:

Figure 3

Thus, the principle and the establishment of a model may emerge as an integrated form.

② Criteria for Recognition of Inventor When an Invention is Completed by Experiments and Principle and Model are Revealed Together

Many of the cases where recognition of an inventor becomes a difficult issue in court decisions are of this type.²¹ That is because distinguishing the principle and model from assisting actions supporting the principle and model (discussed in detail in (6) below) becomes more difficult than when the principle and the model are distinguishable. (5.1) and (5.2) give examples.

In those cases, the criteria for recognition of an

even after invention is made. This case can be shown as follows: reproducible phenomenon = establishment of a model (completion of an invention) → principle.

²⁰ In the case of an invention of a product, experimental conditions lead to establishment of a model (or part of it) if a production process is used to identify the product.

²¹ As a matter of course, a person who conducts experiments for application or commercialization of an accomplished invention cannot be an inventor. Such experiments often cost more money and labor, and should be evaluated separately as discussed in chapter 6.

inventor are whether there was contribution to (a) discovery of a reproducible phenomenon; (b) setting of experimental conditions and (c) obtaining the product in question, at the time when patented matters were found, during the repeated process of commencing, implementing and analyzing experiments.

The Tokyo District Court decision on September 12, 2006, as cited above, noted that a composition with the desired property was obtained through trial-and-error-based experiments where combinations of various components are tried. (The court decision in (5.2) (2) also stressed trial and error.) Here, "trial-and-error" can be deemed as the mode and form of experiments, but recognition of the inventor requires analysis of the content and essence of the experiments to identify any contribution to (a), (b), and (c) listed above. (If "a composition with the desired property" constitutes (c), "trial-and-error-based experiments" correspond especially to (a) and (b), and "combinations of various components are tried" to (b).)

The relationship may be graphically shown as follows:

Figure 4

③ Clarification of Experimental Conditions Leading to Reproducible Phenomenon

Possible elements of experimental conditions are for instance as follows.

(a) Invention of a product:

(i) raw material; solvent; catalyst, etc.

(ii) operating (production) conditions: chemical (reaction) formula; temperature; pressure; atmosphere; pH; (reaction) time; oxidation-reduction potential; flow rate, etc.

(iii) composition (structure): chemical (structural) formula; components; molecular weight; melting point; density; particle size; crystallinity; specific surface area; hydration degree; strength, etc.

(b) Invention of method for producing a product: (i) and (ii), etc. in the preceding item (a)

④ Experiments do not always need to be actually carried out. It is sufficient that an experiment is logically anticipated to have a certain result.²²

(5) Establishment of a Model

This expression may be easier to understand with mechanical systems. (Mechanical systems are a typical type of physical-object systems which will be discussed in detail in (4.2)(1) below.) The first patent system was established in Britain in the seventeenth century and supported the industrial revolution. Early inventions included John Kay's flying shuttle to weave clothes, Richard Arkwright's water

²² Kouzou Ono & Atsushi Watanabe, Actual Intellectual Property and Technology Development 152 (Nikkan-Kogyo-Shimbun 1995).

Because experiments as practical examples substitute for a principle, there could be examples of, for instance, finding the limit, producing the best effect, etc.

powered cotton mill, and Edmund Cartwright's power loom, etc. all of which are mechanical products. That is to say, typical inventions are related to mechanical products (physical-object inventions).²³

On the contrary, such terms as "synthesis" seem more appropriate for chemical products. (Chemical products are of a typical type of material invention which will be discussed in (4.2)(1).) However, in broader terms, "synthesis" may also be deemed as establishment of a model.

(6) Conception based on a Principle or Establishment of a Model and Assisting Roles

Whether or not the activities of a person involved amount to conception based on principle or establishment of a model should be decided based on whether such activities were, specifically for instance, ① conception based on a principle/establishment of a model; ② prior preparation therefore; ③ acts assisting the conception based on a principle/establishment of a model; or ④ activities verifying the conception based on a principle/establishment of a model following ① (Activities of ②-④ above are generally deemed as "assisting roles" of ①). The problem here is how close the technology created in these activities are to the

²³ It was in 1976 that Japan Patent Office (hereinafter referred to as JPO) started to accept applications for material patents for (a) food products; (b) pharmaceutical products; and (c) chemical substance. Until then they had been not patentable, to protect (a) people's lives; (b) people's lives and domestic industry; and (c) domestic industry, respectively.

principle/model.

If, therefore, an invention was completed with an experiment involving two or more persons, whether or not one is deemed as an inventor will be decided by the degree of contribution to (a), (b) and/or (c) mentioned in (4)② above.

A person who carried out assisting activities only is deemed as an assistant, not an inventor.²⁴

(2.4) Positioning of Problem to be solved (purpose of invention) toward Formation Stages

Problems to be solved by an invention (purpose of the invention) usually constitute the stage prior to the conception (proposal of a concept), because a concept is generally considered for a certain purpose. Also, it can be generally said that a concept (and its embodiment) has originality (creativity) but a purpose does not. Accordingly a person who only suggested such a problem to be solved is not an inventor.

²⁴ See Yoshifuji, supra note 12, at 188. The following examples are shown that (a) "a mere manager" who engages in general management task toward his/her subordinates, such as a person who does not propose a specific concept but a mere generic theme or a person who merely gives general advice/direction during the course of invention; and (b) "a mere assistant" who, for instance, sorts data or conducts experiments at the direction of researchers, are not inventors.

Based on that understanding, a person, who played an assisting role as indicated in the above text, should be deemed as a mere assistant or a mere manager, as the case may be. Supervisors in (5.1) and (5.5) should be mere managers.

Yoshifuji's theory has been cited in a significant number of court decisions as the criteria for finding inventorship.

As we have discussed, a conception is made for a purpose. For instance, in the case of a system for conveying granular matter through a pipe, the purpose is a clog-free pipe, for which concepts for improving the shape and structure of the pipe to ease the flow of grains are made.

In practice, however, problems to be solved do not always precede conception. In some cases such as an invention of use which claims a new use for known material, the problem itself becomes the conception. Moreover, a principle (conception) may come first, then problems to be solved may be thought of later, when someone thinks "using such a principle, other existing problems could be solved."

(2.5) Issues Relating to Employee Invention

Recognition of inventor/joint inventor has recently become a bigger issue in Japan in relation to employee invention which is defined in Patent Law (Article 35). Employee invention system is a system for balancing the right of employees as inventors and the right of employers who hire those employees and provided facilities and money to those employees. The Law provides as follows:

① An employee invention (an invention by employee) means an invention which is made by an employee in the course of his/her duties and which belongs to the scope of business of his/her employer. (Article 35(1))

② In principle, an employee invention is owned by the employee,

and the employer obtains a free non-exclusive license for the invention. (Article 35(1))

③ By way of exception, an agreement or employment regulations (such as so-called employee invention rules) may be made in advance to allow the employer to inherit the right to obtain patent. (Article 35(2)) In such a case, the employee is entitled to a reasonable compensation (a reasonable value) paid by his/her employer. (Article 35(3))

In practice most companies (at least certainly for major technology companies) have employee invention rules as indicated in ③, reversing principle and exception in ② and ③. Together with the recent trends of increasing awareness of rights and growing mobility in labor market, that has led to an increasing number of lawsuits brought by former employees against their old employers requesting reasonable compensation.²⁵

²⁵ In an action where professor at University of California, Santa Barbara, Shuji Nakamura filed suit against his former employer Nichia Corporation, alleging that he invented blue light emitting diode (LED) while he was employed by Nichia as a researcher and demanded a reasonable compensation, Tokyo District Court decided on January 30, 2004 (1852 Hanrei Jihō 36) (1150 Hanrei Taimuzu 130) that the compensation should be 60.4 billion yen (while actually ordered to pay 20 billion yen as it was the amount demanded by the plaintiff), attracting a wide range of attention. (However, the parties settled at Tokyo High Court on January 11, 2005 with the total of 843,910,000yen.)

With the pressure from the business world as well as increasing number of disputes relating to employee invention and soaring compensation, Article 35 of Patent Law was amended in May 2004. With respect to a reasonable compensation, the amended law provides that it will be computed in accordance with the reasonable employment regulations relating to

Although traditional disputes relating to employee inventions were mainly focused on (a) whether or not the former employee is the inventor; on the premise (a), on (b) how to compute the amount of compensation, recently more disputes are focused on (a). Then it is said that there are more decisions denying that former employee is the inventor, and such cases are in the majority.²⁶

In Japan where there is a unique group mentality (including mere formality, which does not always have negative effects), most inventions made in organizations are claimed as joint inventions made by supervisor and subordinate staff, or by university professor and his/her staff researchers, etc. For that reason, recognition of an inventor, especially a joint inventor, constitutes a big issue in and outside court, to both plaintiffs and defendants.²⁷ Most court decisions cited in this study, especially all of those in Chapter 5, relate to whether an employee invention is a joint invention or not.

employee invention (Article 35(4)), and if such regulations do not exist or they are unreasonable, the amount will be decided taking into account the interests and burden of the employer, treatment of the employee and other matters (Article 35(5)).

²⁶ Takakuni Yamane & Makoto Tokii, *Recognition of True Inventor - Fine-grained Core Case*, 20 *Intellectual Law & Policy Journal* 273 (2008).

²⁷ The same problem often occurs presumably, because research activities are usually carried out within an organization by people involved in a hierarchical relationship which makes it difficult to clarify objective actions/ subjective engagement by the people involved. Here (5.1), (5.2) and (5.5) are related to engagement between supervisor and his/her subordinate, but both supervisor and subordinate are deemed as inventors only in (5.2) and inventorship of the supervisor is denied in (5.1) and (5.5), while the subordinate is deemed as the inventor.

3. Formation of Joint Invention and Criteria for Recognition of Joint Inventor

(3.1) Joint Invention and Its (Objective/Subjective) Requirements

A joint invention is "an invention which is made cooperatively by two or more persons who provided activities necessary to form the invention through subjective engagement (personal communication) with other inventors."²⁸ Based on

²⁸ Japanese Patent Law does not have provisions relating to joint invention, but Copyright Law defines "work of joint authorship" as "a work collaboratively created by two or more persons with respect to which the contribution of each person cannot be served and separately exploited."

this definition, it can be said that (a) "activities necessary to form the invention" are the objective aspects of a joint invention and (b) "subjective engagement with other inventors" constitutes the subjective aspects of a joint invention. Both objective and subjective aspects are requirements for a joint invention.

To be specific, (a) activities necessary to form the invention (objective aspects) are to involve in distinctive structural elements of the invention and to contribute either to "establishment of a model" or "conception based on a principle" in relation to them. (b) subjective engagement is related to (b1) heading for the progress of research and development (whose results will form the invention) and (b2) consultation, exchange of opinions, advice, direction or instructions, etc. among persons involved. Requirements of (b1) constitute intention including purpose²⁹ and those of (b2) show the mode of subjective engagement. With respect to (b2), the degree of engagement is low in consultation and increases gradually from exchange of opinion to advice to direction to instructions. Generally, it is supposed that mere consultation is not satisfactory (to be recognized as subjective

(Article 2(1)(xii) of Copyright Law). Co-principals are "two or more persons who commit a crime in joint action" (Article 60 of Penal Code) and require (a) subjective intention of collaboration and (b) objective fact of collaboration to be established.

²⁹ It should be more broadly construed than purpose as purpose is not always clearly paid attention.

engagement), while exchange of opinion, advice and direction may be sufficient depending on the technical contents of the communication, and instructions are more sufficient. The technical contents will be judged from the viewpoint of whether the technical ideas are general or specific and abstract or concrete, the level of technology, and the effectiveness of the communication.

(3.2) Criteria for Recognition of Joint Inventor

A joint inventor is a person ① who is directly involved in activities dealing with the objective aspects described above in (a); or ② who indirectly contributes to the person conducting activities indicated in ① through subjective engagement. (Persons of ① also must have subjective engagement with each other.) (criteria for recognition of a joint inventor) ① may be included in a "directly-involved joint invention" and ② an "indirectly-involved joint invention," which is mentioned below. The extent of the above contribution/involvement (proportion of contribution) will constitute the basis for deciding the share of the invention owned by each joint inventor.

(3.3) Directly-involved Joint Invention and Indirectly-involved Joint Invention

For convenience, some patterns of formation of a joint invention may be graphically explained as follows.

Figures 5, 6

(1) Directly-involved Joint Invention

Figure 5 shows the cases where objective aspects of a joint invention, i.e., conception based on a principle or establishment of a model, is carried out directly by the persons concerned. That is why I call the cases of Figure 5 "directly-involved joint inventions." In the Figure, the width of (a)(ii) and (b)(i) represents whole contribution to (a)(ii) and (b)(i). ① in Figure 5 shows the case where both A and B contribute to both (a)(ii) and (b)(i), ② shows where A contributes to both while B contributes only to (b)(i), and ③ shows where A contributes only to (a)(ii) and B only to (b)(i). ④ shows where A and B each contribute half of (a)(ii) and half of (b)(i), and ⑤ where when A contributes to (a)(ii) and half of (b)(i) while B contributes to half of (b)(i). Dashed circles in the Figure show that there are satisfactory subjective engagement among people concerned, and those circles in Figure 5 indicate subjective engagement between A and B.

In the case of ① and ② in Figure 5, both A and B are directly involved in the objective aspects of the invention forming joint invention by A and B, while in case ③ no collaboration exists in the objective aspects, so that a significant (strong) level of subjective engagement between A and B is required for a joint invention by A and B to be recognized. In ④, neither A nor B can carry out (a)(ii) or

(b) (i) on their own; they become able to carry out (a) (ii) and (b) (i) for the first time when they collaborate with each other. In ⑤, neither A nor B can carry out (b) (i) on their own but they can do so through their collaboration. In both ④ and ⑤, A and B need to subjectively engage with each other to a significant extent. Based on the foregoing, the share of A and B in the invention will be 50% each in the case of ①, ③ and ④, two-thirds for A and a third for B in the case of ② and three-fourths for A and a fourth for B in the case of ⑤.

(2) Indirectly-involved Joint Invention

Figure 6 shows the cases where C indirectly contributes to creation of an invention through significant subjective engagement with those (inventors) who carry out "conception based on a principle" or "establishment of a model." That is why I call the cases of Figure 6 "indirectly-involved joint inventions." An indirectly-involved joint invention is premised on the existence of a sole invention or directly-involved joint invention.

Dashed circles at ⑥ of Figure 6 show subjective engagement of A and B, and contributor C. If there is a strong engagement, C as well as A and B are deemed to have made a joint invention. In the case of ⑦, the invention would be deemed to have been made solely by A if it were not for C's involvement (contribution). On the contrary, if C's subjective engagement is significant, the invention will be deemed as a joint

invention made by A and C. Dashed circles in ⑧ mean subjective engagement between A and B at the left and between B and C at the right. If the subjective engagement is strong, the invention will be deemed as a joint invention made by A, B and C.

When subjective engagement of a contributor intensifies to the extent that he/she can now be deemed as involved in the objective aspects of the invention, ⑦ in Figure 6 is deemed to have been transformed to ② in Figure 5, in which case the inventor and the contributor form directly-involved joint invention. Moreover in the case cited above where the strength and contents of subjective engagement makes the indispensable contribution to an objective aspect, ⑦ in Figure 6 is deemed to have been transformed to ⑤ in figure 5, forming a directly-involved joint invention.

(3) Mixed Joint Invention Model (Mixture of Directly-involved Joint Invention and Indirectly-involved Invention)

There can be a case where involvement in objective aspects (directly-involved invention) and engagement in subjective aspects (indirectly-involved invention) are mixed. In a way, the pattern of ⑨ in Figure 6 is a mixture of ② in Figure 5 and ⑦ in Figure 6.

Such a combination occurs when, for instance, establishment of a model (a) is partly carried out (direct involvement) and (b) is done through abstract and general

exchanges of opinion, advice or direction (indirect involvement). With only one of (a) or (b), the contributor cannot be deemed as an inventor. If, however, the combination of (a) and (b), as so-called "one to be unified," amounts to (i) implementation or something close to implementation of establishment of a model or (ii) contribution or something close to contribution to establishment of a model with significant subjective engagement, C may be deemed as a joint inventor.

In fact, a directly-involved joint invention and an indirectly-involved joint invention become close or a mixture of the two may happen as stated above, so it should be useful to analyze various kinds of cases based on the theories of directly-involved joint invention and indirectly-involved joint invention.³⁰

(3.4) Subjective Aspects (Subjective Engagement)

³⁰ Here I try to grasp the relationship between directly-involved joint inventor and indirectly-involved joint inventor, in analogy, referring to the relationship between co-principal and a person who induces another to commit a crime. Establishment of co-principals have been discussed in note 28. "A person who induces another to commit a crime shall be dealt with in sentencing as a principal". (Article 61 of Penal Code). That is to say a co-principal corresponds to a directly-involved joint inventor, and a person who induces another to commit a crime to an indirectly-involved joint inventor. An invention and a crime share commonalities that they are both "carried out with collaboration." Therefore note 28 relating to co-principals and what is discussed in this note can be considered as one of reasons why it is appropriate to discuss about joint invention in this paper in which objective aspects/ subjective aspects is required, and classification by directly-involved joint invention and indirectly-involved joint invention is introduced.

(1) Satisfaction of Subjective Engagement

Whether or not the requirement of subjective engagement is met will be decided, in directly-involved joint invention, on whether the subjective engagement connects objective aspects with each other to result in a joint invention. In indirectly-involved joint invention, on the other hand, a joint invention will be recognized depending on whether the subjective engagement made at least a similar contribution that the inventors made in the objective aspects, assuming that the invention has been established. Those criteria will keep the bar for recognizing an indirectly-involved joint inventor as high as that for a directly-involved joint inventor.

The structure of directly/indirectly-involved joint invention and their objective aspects/subjective aspects may be graphically explained as follows:

Figure 7

(2) Organizational Consideration on Subjective Aspects (Subjective Engagement)

Here we consider possible organizational issues in and outside companies in relation to the foregoing discussions.

① Relationships Outside Company

When experiments, measurement and test production, etc. are outsourced to an outside company, employees of such an outside company who obtained the results (of experiments and measurement, etc.) will not be in principle deemed as inventors.

They seem to satisfy objective requirements for a joint inventor. They, however, are not deemed to meet the subjective requirements (subjective engagement) for a joint inventor, working and heading "for the progress of research and development (whose results will form the invention) ... among persons involved." They are merely deemed to have conducted requested experiments and measurement.³¹

② Relationship Within Company

Even within a company where some departments are directly engaged in research and development "for the progress of research and development (completion of an invention)," others which carry out measurement and other tasks at the request of research and development departments may not fulfill the subjective requirements of a joint inventor. In such a case, employees of research and development departments only may become inventors.

(3.5) Procedures Under Patent Law in Japan

A patent application must indicate the name of inventor (Article 36(1)(ii) of Patent Law).³² If the right to obtain

³¹ Rights and obligations will be kept clear, if there is a provision in the outsourcing agreement relating to experiments and measurements that all related interests will be settled by payment of consideration and that outsourced company will not enforce its right.

³² In Japan where first-to-file system is adopted, JPO does not usually request submission of documents relating to the inventor or to transfer/assignment of rights from inventor to applicant. Partly because of such background, it has been considerably left up to the applicant regarding whom to name as an inventor in application documents. Sometimes, for instance, not the true inventor but a supervisor or colleague of the

patent is jointly owned because subject invention is jointly made, the patent application must be jointly filed. (Article 38 of Patent Law) Failure to comply with the requirements will constitute reasons for rejection (Article 49(ii) of Patent Law) or reasons for invalidation (Article 123(1)(ii)). By choosing a person who satisfies all the criteria for an inventor as described above and others, the application will become more appropriate. As a result, description of the inventor in application documents will become more limited, and disputes as to the real inventor will become fewer.

Recently, the Intellectual Property High Court rendered its decision on March 29, 2007³³ in a case where appellee (defendant) Toyota Central R&D Labs, Inc. refused to recognize that the appellant (plaintiff), who was entered in the Patent Gazette as an inventor, was an inventor, and argued that the inventor is a person whose name had never been in the Patent Gazette. It should be noted that the Court decided as follows.

The acts of defendant, "to argue outright that

inventor, persons conducting experiments for commercialization (to encourage technical development and to expect the results), customers/business partners, persons relating to public agencies (to enhance credibility of the patent), etc. have been named.

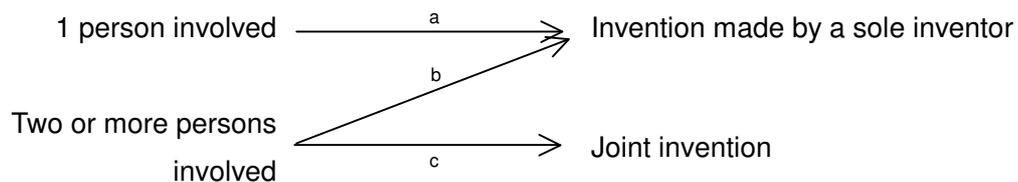
³³ 1972 Hanrei Jihō 135 (Intellectual Property High Ct., Mar. 29, 2007); 1241 Hanrei Taimuzu 219. In this case, recognition of an employee invention was disputed with respect to a joint invention.

Japan's Intellectual Property High Court (hereinafter referred to as IP High Court) was established on April 1, 2005 to expedite better court proceedings relating to intellectual property (patent right; utility model right; design right; trademark right; copyright, etc.)

plaintiff ... is not the inventor in an action brought by plaintiff to request payment of compensation for an employee invention, constitute a contention that is inconsistent with its own description made with the Patent Office pursuant to Article 36(1)(ii) of Patent Law, and are not allowable without exceptional circumstances because such acts violate fairness and equity (estoppel)."³⁴

4. Method for Recognition of Inventor/Joint Inventor

The following relationship exists between the number of persons involved and the accomplished invention. (5.1) and (5.5) are examples of b. and (5.2) is an example of c.



General criteria for recognition of inventors in (2.2) are related to a, b and c, and criteria for recognition of joint inventors in (3.2) are related to b and c.

(4.1) Factors in Arrangement of Cases for Recognition of Inventor/Joint Inventor

³⁴ The foregoing discussion has been relating to recognition of an inventor for a joint invention. On the other hand, to whom an invention belongs is determined by the relationship between the inventor and the organization which the inventor belongs to or existence of agreements between businesses. For instance, generally in Japan, ownership of the invention will be determined by employee invention rules in the case of an invention made within a company, or by joint research and development agreement and other agreement between companies involved if the invention is made between businesses.

(1) Conventional Theories for Recognition of Inventor

In a study which we will discuss later (4.3) in detail, Judge Ryoichi Mimura focuses on "anticipation" of embodiment of a conception to recognize an inventor, stating that such an anticipation is easier for mechanical inventions but harder for chemical inventions.³⁵

In this study, the essence of such conception and embodiment correspond to "conception based on a principle" (which is referred to as "the principle" in Chapter 4 for convenience) and "establishment of a model" (which is referred to as "the model").

(2) Discussion of Factors in Arrangement of Cases for Recognition of Inventor/Joint Inventor

In considering the criteria for recognition of inventor/joint inventors and Mimura's theory above, certain factors used to arrange cases applying to the criteria (which is referred to as "the factors" in Chapter 4) are identified. I will discuss these next. The relationships here are: criteria → factors → arrangement by factors → recognition of inventor.

① First, whether a person is an inventor or not (an assistant) is determined by his/her contribution to the principle or model. To this end, the scope of the principle and the model needs to be clarified. (i) Once the principle and the model are

³⁵ Ryoichi Mimura, *Meaning of Inventor*, 1236 Kinyū Hanrei 122(2006).

clearly identified, the principle or the model and assisting actions can be more easily distinguished. Moreover, (ii) distinguishing the principle and the model will also constitute the premise for evaluating anticipation of the model based on the principle.

In this connection, I will consider whether it is possible to distinguish the principle and the model, and make this one of the factors.

② Next, I will consider whether it is easy to anticipate the model from the principle, which is also mentioned above in the Mimura's theory, and make this another of the factors.

(3) Sorting by Factors

Subject inventions can be reviewed according to these factors, i.e. from the viewpoint of "distinguishability" of the principle and the model and easiness of "anticipation." To make this process easy, viewpoints of physical-object invention and material invention are introduced.

(4.2) Physical-Object Invention and Material Invention

(1) Physical-Object Invention and Material Invention and Reasons for Introducing the Concept

Introduction of the viewpoint of physical-object invention and material invention aims to establish a method of recognizing an inventor, starting with how an invention is expressed (appearance, property) as described next and then considering the factors indicated above. In respect of

physical-object inventions and material inventions, their distinctive structural elements are analyzed.

A physical-object invention is an invention which focuses on the effect of certain combination of articles, shape of an article, etc. A material invention is an invention which focuses on the nature (material property) of an article (including transformation of an article).

Based on the characteristics of physical-object inventions and material inventions, recognition of an inventor involves the following. (Objective aspects are considered if there are two or more contributors.)

① In the case of a physical-object invention, distinguishing the principle and the model is possible as it is rather easy to perceive the principle and the model with the five senses and the principle is often simple, which leads to the following results.

a. It is often easy to anticipate the model from the principle. In such a case, only the person who comes up with the principle can be the inventor. A person who is involved only in establishment of a model cannot be an inventor, because establishment of a model in this case lacks in originality and establishment of a model is not deemed as a criterion for recognition of an inventor described in (2.2).

b. If, however, the establishment of a model from the principle is beyond a scope of anticipation (difficult to be anticipated),

the model apparently has been established through experiments etc. and the person who established the model may also be the inventor. In such a case, the shares of the person who comes up with the principle and of the person who establishes a model will be decided based on the technology involved.

② In the case of a material invention, the situation may be considered as follows.

c. Since the principle is difficult to be found because of its complexity etc., it is often substituted by a reproducible phenomenon obtained through experiments etc. Because a model is simultaneously established with the reproducible phenomenon in such a case, the reproducible phenomenon and the model are integrated and cannot be distinguished. (If a principle is understood, the principle and the model are usually integrated.) If experiments make clear the formation of a product and its process (reproducible phenomenon), the person who conducts such experiments and identifies the reproducible phenomenon is often regarded as the person who has established the model and thus is the inventor. Not only the person who conducted the experiments (directly-involved inventor) but also the person who gave instruction etc. for the experiments (indirect inventor) can be regarded as inventors depending on the contents of the instructions etc.

d. Sometimes, however, the principle/the model are distinguishable. For instance, there can be an established

process for building a model based on a principle. There likely are many cases where anticipating the model from the principle is difficult.³⁶ Hence the person who comes up with the principle and the person who establishes the model will be deemed as inventors. This pattern is shown in (5.3).

The arrangement of ① and ② above may be illustrated as follows:

Figure 8

Because physical-object inventions and material inventions are based on the viewpoint of creation of technical ideas as described in detail next, this viewpoint is used to recognize an inventor with the analysis of the case and factors, and is supposed to contribute to formalized (stabilized) recognition of inventors.

(2) Basis of Physical-Object Invention and Material Invention

As we have discussed, "an invention is ... creation of technical ideas utilizing the laws of nature." (Article 2(1) of Patent Law). A patented invention also must be industrially applicable. (Article 29(1) of Patent Law). Therefore, inventions may be categorized according to the viewpoint of (A) technical field (use) based on the requirement of

³⁶ It is supposed that there can be other cases besides the example in the above text, or cases where a model is easily anticipated from a principle. It is thought that the consideration of these cases is necessary for the future. Reviewing a, b, c and d relating to physical-object and material inventions, it becomes clear that c, in material inventions, is distinctive .

industrial applicability; (B) laws of nature (principle) as required in the definition of an invention; and (C) creation of technical ideas also, as follows.

Figure 9

I would consider the categorization with an example of simple technology as shown in Figure 10. Confronting a force from the arrow (\rightarrow), ① if support by conventional technology lacks the sufficient strength; ② stronger materials are used for support; or ③ a leg is provided where the force bears, to disperse the force.

Figure 10

The support system in ② uses alloy (new materials) that is stronger than conventional steel. In ③, the support system is combined with a base and a leg (both usually made of conventional steel) or an apparatus shaped like ③ is used to hold up the load. In this case the stability of the apparatus will be also improved. Here ② is a material invention and ③ is a physical-object invention.

The viewpoints of (B) and (C) in Figure 9 are focused on distinctive elements of the invention.

In the field of electricity, for instance, (a) inventions relating to circuits are physical-object matters, while (b) those focused on the property of materials of semiconductors/magnetic substances are regarded as material inventions.

Devices protected under Utility Model Law belong to

physical-object inventions as they are "relating to the shape or structure of an article or combination of articles."

(Article 1 of Utility Model Law)

Some inventions are a mixture of physical-object and material inventions. (5.5) is supposed to give an example of this kind of invention. ((5.5) (3) ③)

(3) Invention of a Method/Invention of Method for Making Product

Inventions of a method include invention of a method to make a product and inventions of other methods (non-production method, such as communication method; measuring method and method of using machinery).³⁷ Here I discuss application of the physical-object and the material inventions to method inventions.

① Invention of Method

An invention of method "consists of two or more actions or phenomena that are systematically related to each other for a certain purpose, ... and has temporal elements."³⁸

Temporal stages comprising "the method" are considered in the same way as inventions of products (physical-object and material).

② Invention of Method for Making a Product

³⁷ Under Japanese Patent Law, inventions can be categorized by (a) an invention of a product; (b) an invention of a method; and (c) an invention of a method for producing a product. (Article 2(3) of Patent Law)

³⁸ 8(8) Gyōsei Reishū 1463 (Tokyo High Ct. May 21, 1957).

A method for making a product may include among the processes (a) a stage of combining articles and (b) a stage where a material property is transformed. The former is a physical-object stage and the latter is a material stage.

Each stage has distinctive aspects and non-distinctive aspects. Generally if there is a material stage, as there is a transformation of property, the stage is supposed to be the distinctive stage in the method for making a product.

Also generally speaking, the embodiment of a concept is important (though to various degrees) in an invention of method including the method for making a product. The following reasons may be supposed; (a) method has a direct connection with utilization and (b) the embodiment is a combination of different stages of the "method"/ process; consequently the actual model is important in an invention of method.

(4.3) Analysis of Previous Controversy Over Anticipation of Embodiment of Invention Based on First Conception

(1) Mimura's theory cited in (4.1)(1)³⁹ can be summarized as follows:

The person who first conceived an idea is often regarded as the inventor in the field of electricity. The same can be said of the field of machinery, because the results of embodiment can be anticipated at the stage of conception. In the field of chemistry, on the other hand, the person who merely

³⁹ See supra note 35.

conceived an idea cannot always be deemed as an inventor and sometimes both the person who conceived the idea and the person who carried out development are named as inventors, because it is hard to anticipate the results of embodiment from a concept and conception does not immediately lead to formation of an invention.

This logic is adopted by the appellate court of (5.2) decision and the similar logic is applied in (5.1).

(2) Analysis

Although inventions are categorized into the fields of electricity, machinery and chemistry to identify an inventor, they seem to be better categorized into physical-object inventions and material inventions, because the latter categorization suits creation of technical ideas which is essence of invention. In fact, the appellate court of (5.2) decision which adopted the categorization by technical fields (use) could not give consistent reasoning. ((5.2) (3) ②)

Mimura's theory also cannot become the basis for distinguishing inventors from assistants.

(4.4) Procedures for Recognizing Inventor/Joint Inventor

Based on the foregoing, the inventors/joint inventors (including the ratio of their contributions) may be decided by the following steps/procedures, for instance.

(1) Objective Aspects (with respect to Inventor/Joint Inventor; see also Fig. 8)

- ① To select and extract distinctive structural elements (patentable matters) of an accomplished invention, and decide whether they are physical-object or material elements;
- ② To identify a principle and a model in the above elements;
- ③ In the case of a physical-object invention, there are both cases where (a) the model is easily anticipated from the principle; and (b) the model is difficult to be anticipated from the principle (beyond the scope of anticipation). In (b), the model is established through experiments etc.

In (a), the person who set the principle will be the inventor, while in (b) both the person who set the principle and the person who established the model will be the inventors.

- ④ In the case of a material invention, inventions are often made through experiments. In those experiments when patentable elements mentioned in ① are found, a person who contributed to (i) discovery of the reproducible phenomenon; (ii) setting of experimental conditions; and/or (iii) obtaining the product will be an inventor.

When there are established procedures for making an invention, the principle and the model can be distinguished, and both the person who set the principle and the person who established the model will be the inventors, because it seems to be difficult to anticipate the model from the principle.

- ⑤ Those who do not meet the level of ② or who are not deemed as an inventor in ③ and ④ are assistants.

⑥ Where there are two or more inventors, the share of each joint inventor will be decided by their contribution to ③ and ④.

(2) Subjective Aspects (by which a joint inventor may be identified)

① Subjective engagement must exist among those who are deemed as inventors with respect to objective aspects. (directly-involved joint invention)

② If involvement through subjective engagement with those, who are deemed as inventors with respect to objective aspects, is deemed as a contribution close to making the conception based on a principle or close to establishment of a model, this contributor will be deemed as a joint inventor. (indirectly-involved joint invention)

Even if inventions are not categorized as physical-object inventions or material inventions as in (1) above, the procedures described above can still apply. In that case, consideration of physical-object elements or material elements in ①, using "physical-object invention" in ③ and "material invention" in ④ need not be done. Also, in Fig. 8, inventors are identified from columns B and C, eliminating A. The effect of using categorization by physical-object and material elements is that inventions in question can be easily analyzed like in columns B and C.

5. Review on Issues Related to Recognition of Joint Inventor in Court Decisions

Based on the discussion in this study, major issues relating to formation of a joint invention are analyzed and sorted as follows, and court decisions relating to recognition of joint inventors are reviewed.

Table 1

(5.1) and (5.2) are related to a material invention (c in Fig. 8) and an invention of a product and an invention of a method for making a product; (5.3) is related to a material invention and an invention of a product (d in Fig. 8); and (5.5) is related to a physical-object invention and an invention of product (basically focused on the shape of divisible tablets of a drug; b. in Fig. 8)

(5.1) Decision on August 27, 2002 by Tokyo District Court

⁴⁰(trial court decision on Pfizer's "fine-grained core" case)

This decision is here discussed somewhat in detail including strategies of parties involved, as it is deemed a marginal case.

(1) Outline

Defendant Pfizer Japan Inc. is a Japanese corporation wholly owned by the US company, Pfizer Inc. Plaintiff, who used to be Defendant's manager of Formulation Research Group, argued that he made, together with A who worked under Plaintiff, a patented invention "fine-grained core" (Japan Patent Number (hereinafter referred to as JP) 2576927) and requested Defendant to pay seventy-million yen as a reasonable compensation for the employee invention. Defendant didn't agree, arguing that Plaintiff is not the inventor and only A is the inventor. The Patent Gazette stipulated the name of Plaintiff, A and B, an employee at patent department, as inventors, and Defendant had paid to Plaintiff sixteen-thousand yen as a compensation based on the compensation standards for employee invention. The court denied Plaintiff's inventorship, and dismissed Plaintiff's request.

(2) Decision (Summary)

① Patentability of the claimed invention lies in the

⁴⁰ 1810 Hanrei Jihō 102 (Tokyo D. Ct. August 27, 2002); 1117 Hanrei Taimuzu 280.

significantly increased use, more than 60 percent by weight, compared to conventional proportion of less than 25 percent, of crystalline cellulose, a vehicle to be mixed with the principal agent, to increase yield. Crystalline cellulose was increased to 69 percent by weight and an appropriate rotation speed was set for the agitator and chopper "based on proposals made by a specialist engineer C"⁴¹ who belonged to the company to which Defendant outsourced experiments. The claimed invention is C's invention or a joint invention made by C and A who participated in a number of experiments with C.

② (a) To solve the problem identified by Defendant (to obtain more spherical, fine-grained core (author's note: containing the principal agent) at a higher yield rate);

(b) "finding optimal experimental conditions «such as blend ratio of each agent, temperature and rotation speed of an agitator in the agitation granulation method» was the key;"⁴²

(c) combining (i) the process for making fine-grained core by blending the principal agent which was known at that time and the vehicle, and (ii) the process for obtaining more spherical, fine-grained core for coating at a higher yield rate disclosed in Terashita⁴³ (author's note: published study found by

⁴¹ Id. Hanrei Jihō at 110.

⁴² Id.

⁴³ Keijiro Terashita et al., *Granulating Process and Granulation End Point of Fast Agitating Granulator*, 107(5) *Yakugaku Journal* 377 (1987), etc.

This article analyzed and reported, based on experiments, granulating process, end-point, operating conditions, relationship to the method of

Plaintiff and provided to A), to produce spherical, fine-grained core containing principal agent (author's note: item numbers (i) and (ii) are added by the author), is not in itself specific enough to be called as an invention: rather it merely shows the general direction of solution of the problem. The Court, therefore, cannot decide that Plaintiff is a joint inventor even if Plaintiff conceived the above idea (the underlined part above) (author's note: which is equivalent to a "mere intuition").

(d) (author's note: With respect to the above conception argued by Plaintiff,) unlike when an invention "is relating to mechanical structure," when an invention "is relating to the field of chemistry or the field as in the present case" it is "rather a few"⁴⁴ that the person who conceived an idea is deemed as an inventor even if the idea is new.

(3) Analysis Based on Discussions in This Study

① Types and Issues of Joint Invention

The main problem is whether or not Plaintiff conceived an idea based on a principle which constitutes an objective aspect of a directly-involved joint invention (in Fig. 5①).

② Consideration on Court Decisions

(a) First, we consider whether or not Plaintiff's conception meets the requirement of "conception based on a principle."

adding bonding material with respect to process for making fine-grained core with fast agitating granulator.

⁴⁴ See supra note 40 Hanrei Jihō at 110.

With respect to this court decision, a granulation specialist told me that he believes Plaintiff should have been deemed as an inventor. Placing importance on the facts that Plaintiff actually found *Terashita* and seems to have adopted (refine) it in an effective way, he considers that this conception including these facts which Plaintiff argued (the underlined part in (5.1)(2)②(c)) satisfies requirements of "conception based on a principle." Study papers usually need to be refined (direction of the research needs to be selected)⁴⁵ to be applied, which requires a reader's ability. In this respect my opinion is as follows.

Whether Plaintiff's conception amounted to "conception based on a principle" should be decided depending on whether or not alleged conception allows one to anticipate a technical method to solve the problems stipulated in patent claims (model). (the term "anticipations" used in (5.2)(2) can be noted)

In conclusion, using a significant amount, more than 60 percent by weight, of crystalline cellulose is deemed difficult to be anticipated from *Terashita*, etc.⁴⁶ Hence it seems that alleged conception by Plaintiff did not amount to

⁴⁵ To be more specific in this case, to refine may be to suggest a direction of research activities to solve problems through consideration of, for instance, (a) appropriateness of agitation granulation method; and (b) kinds and blending ratio of raw materials.

⁴⁶ The decision also merely stated that the patentable matter of claimed invention was found from experiments carried out by C (and A).

conception based on a principle or anything close to it.⁴⁷

(b) Next, we consider recognizing the inventor in accordance with (2.3)(4)②(a)(b)(c), assuming that in this case a principle was hard to identify and in its place a reproducible phenomenon was found through experiments.

Experiments and their results leading to patentable matters (mainly significantly increased use, more than 60 percent by weight, of crystalline cellulose) are summarized, with reference to Patent Gazette also, as follows.

Experimental conditions...

Raw materials (principal agent; vehicle (crystalline cellulose), etc.)

Manufacturing conditions (rotation speed of agitator and chopper, etc.)

Product...

Fine-grained core containing principal agent and crystalline cellulose of more than 60 percent by weight and having an average particle diameter of 80-400 μm

Reproducible phenomenon...

⁴⁷ With respect to conception alleged by Plaintiff, if (ii) was used to obtain (i) and if (i) and (ii) belong to fields distant from each other (*Terashita* does not refer to the term "vehicle"), the fact that (ii) was found and proposed (the supervisor usually might have given his comments to his subordinate) can be deemed as contribution to formation of the invention. The granulation specialist cited in (5.1)(3)②(a) seems to have presumed/considered such background. See, however, (5.1)(3)④ and chapter6 for the needs for evaluation and treatment from the viewpoint of comprehensive technical evaluation, when a person who is not an inventor is deemed to have contributed to the creation of invention.

Stipulated as practical example included in detailed description of invention on Patent Gazette.⁴⁸

Plaintiff was not involved in those experiments. Accordingly Plaintiff's activities are deemed within the scope of assisting role, not the role of an inventor (a mere manager⁴⁹).

(c) Though (2)②(d) takes a similar idea to Mimura's theory as cited in (4.3)(1) (the chief judge in charge of this case was Judge Mimura), what "the field as in the present case" means is not clear. It would have been clearer if the court denied Plaintiff's inventorship on the ground that because the patented invention is a material invention consisting of a product (fine-grained core) and the method for making a product, the person, who carried out experiments and found the reproducible phenomenon, set the experimental conditions and/or obtained the product through experiments, should be the inventor. (See (2.3)(4)② and (4.4)(1)④)

③ Consideration on Plaintiff's Legal Strategies

In this case, if Plaintiff could have (a) refined the use of *Terashita* and pursued more the relationship (principle, or reproducible phenomenon through experiments) between improved yield rate of fine-grained core and increasing the crystalline cellulose (objective aspects of directly-involved

⁴⁸ See also supra note 22.

⁴⁹ See supra note 24.

joint invention), and (b) played a more instructive role (subjective engagement of indirectly-involved joint invention) or cooperative role (objective/subjective aspects of directly-involved joint invention) in experiments, he would have been able to argue those facts or (c) combination of those facts (mixed style). If according to a combination of abovementioned Plaintiff's conception and arguments ②(a), (b) or (c) above, patent claims are deemed to be anticipated, or if Plaintiff had discussed with, given instructions etc. to staff under him and contributed to the direction of the experiments, he might have been able to be an inventor.⁵⁰

④ Plaintiff's Contribution to Invention

Even if Plaintiff cannot be regarded as an inventor, supposing that discovery or effective use of *Terashita* was not something easily conceived, Plaintiff's proposal of the research theme (the underlined part in (5.1)(2)②(c)) may be deemed as a contribution to the invention, which should be properly appreciated/treated (see 6 described later). Generally, selection/proposal of themes is an important element of research and development activities that may even affect the outcome.

⁵⁰ There could be the idea that even a person, who has only a small contribution to the invention, is recognized as an inventor (share is also small) based on his/her comprehensive contribution to claimed invention, as described in the above text.

(5.2) Decision on June 27, 2007 by Tokyo District Court⁵¹
(Toshiba's "photoelectric surface" case)

(1) Outline

Plaintiff (former manager of research and development group and other departments of Toshiba Corp.) and A who had been working under Plaintiff made the patented invention "photoelectric surface and its formation method." (JP2695820) Plaintiff alleged that the invention had been made solely by Plaintiff and demanded fifty-million yen as a reasonable compensation for the employee invention. Defendant Toshiba didn't agree and alleged that the invention had been made jointly by Plaintiff and A and that Plaintiff's contribution to the invention was not more than 5 percent. The court decided that the invention had been made jointly by Plaintiff and A, each of them contributing in the ratio of 50 percent, and ordered Defendant to pay 2,071,574yen.

(2) Decision (Summary)

The essence of claimed invention lies in the process for introducing oxygen before the photoelectric surface of an X-ray tube is formed. That was "embodied ... from the process of trials and errors." It cannot be said that either Plaintiff or A conceived the process on his own before conducting experiments "based on specific anticipations." Plaintiff and

⁵¹ (Tokyo D. Ct. June 27, 2007) Chiteki Zaisan Saibanreishū (Law Report of intellectual Properties), Supreme Court website, available at: <http://www.courts.go.jp/saikosai/>.

A continued with experiments sharing information and exchanging opinions.

While A correctly suggested selecting certain results from the trials and errors, Plaintiff also confirmed the effect of oxygen by experiments to compare with conventional methods and selected appropriate directions for research. Hence both Plaintiff and A reasonably contributed to the completion of claimed invention.

(3) Analysis Based on Discussions in This Study

① This case seems to be the type of directly-involved joint invention where neither Plaintiff nor A satisfies the objective aspects of a joint invention on its own, but Plaintiff and B jointly satisfy the objective aspects. (Fig. 5④) Requirement of subjective engagement between the parties is also satisfied.

② Affirming the trial court (the first court) decision, the appellate court⁵² stated, adopting Mimura's theory described in (4.3)(1), that "when the technology is relating to the field of chemistry, ... not only the person who directly conceived the technical ideas ... but also the person who contributed to the embodiment of the technical ideas will be deemed as inventors."

The international patent classification (IPC) of

⁵² (IP High Ct. February 21, 2008) Chiteki Zaisan Saibanreishū, Supreme Court website.

claimed invention is H01J (electric discharge tubes or discharge lamps) (as included in Patent Gazette), and the technical field is electricity. That brings an issue of consistency with the court finding that "when the technology is relating to the field of chemistry." That inconsistency will be eliminated by categorizing claimed invention as a material invention because introduction of oxygen transforms the property of photoelectric surface, and recognizing the person who found patentable matters (above mentioned(2)) through experiments as the inventor. (See (2.3)(4)② and (4.4)(1)④)⁵³

(5.3) Decision on March 15, 2007 by Intellectual Property High Court⁵⁴ (Otsuka Pharmaceutical's "drug discovery" case)

(1) Outline

With respect to "Tetrazolylalkoxycarbostyryl derivatives and pharmaceutical compositions containing them" (US Patent Number 4277479) (which was filed combining JP1386527 and JP1471849), Appellant (Plaintiff) who had been a biological researcher at Appellee (Defendant) Otsuka Pharmaceutical Co., Ltd. alleged that the patented invention was an employee invention made jointly with synthesis researchers at Appellee and demanded a hundred-million yen as

⁵³ In addition, inventions in the field of electricity consist of physical-object invention and material invention, as described in (4.2)(2).

⁵⁴ 1989 Hanrei Jihō 105 (IP High Ct. March 15, 2007).

a reasonable compensation. The court affirmed trial court decision⁵⁵ and dismissed appeal, denying inventorship of Appellant.

(2) Decision (Summary)

A person who "conducted experiments for the inventor ... merely assisted" and cannot be deemed as an inventor. "Drug discovery (discovery and development of pharmaceutical products) usually follows the stages of <1> selection of target disease; <2> selection of drug target (enzyme, receptor, cells, etc.); <3> establishment of bioassay (test system); <4> discovery of lead compound (compound with desired drug activity); <5> verification of structure/activity relationship (screening test); <6> identification of pharmacophore (summary of functional groups necessary and important to biological activity and their relative spatial configuration: basic structure); <7> improvement of interaction with target; and <8> improvement in pharmacological properties."

Appellant had contributed to <5> but was not recognized as an inventor. The synthesis researchers who contributed to the synthesis stages <4> and <6> were recognized as the inventor.

(3) Analysis Based on Discussions in This Study

⁵⁵ 1988 Hanrei Jihō 106 (Tokyo D. Ct. September 8, 2006); 1272 Hanrei Taimuzu 242.

① The case was related to whether in a directly-involved joint invention, a researcher created objective aspects or merely played an assisting role (the decision also uses the term "assist"). (Fig. 5①)⁵⁶

② Among development stages of pharmaceutical products from <1> through <8> that the court indicated, <4> is deemed as conception based on a principle and <6> as establishment of a model.⁵⁷ Thus in relation to formation of an invention, <5> is deemed to constitute an assisting role. Although claimed invention is a material invention (the decision also used the term "material invention"), it seems that as procedures for making an invention are established, they allow one to distinguish conception based on a principle and establishment of a model. And stage <6> was deemed difficult to anticipate from stage <4>.

(5.4) Decision on August 26, 2003 by Tokyo High Court⁵⁸ (appellate court decision on Pfizer's "fine-grained core" case) - Appeal from (5.1)

(1) Decision (Summary)

⁵⁶ Although the issue in this case is relationship between the synthesis researcher and the biological researcher, if it becomes similar to the relationship between R&D department and Measurement etc. department, the issue of subjective aspects may arise as indicated in (3.4)(2)②.

⁵⁷ They are construed in that way from the terms also such as <4> "discovery of ...lead compound" and <6> "identification of ... basic structure." <1> is seemed as problems to be solved (See (2.1)(2)).

⁵⁸ (Tokyo High Ct. August 26, 2003) Chiteki Zaisan Saibanreishū, Supreme Court website.

① The contributor to the key technical elements of claimed invention is A, because the setting (author's note: of experimental conditions described in (5.1) (2) ①) was "proposed by A (author's note: a staff under Plaintiff) with reference to the advice of specialist engineer C" (author's note: who belonged to the company to which Appellee(Defendant) outsourced experiments).

② Those decisions are based on "C's statement, ... A's statement submitted" to the appellate court, etc. In other words, it is supposed that C was eliminated from inventorship due to problems in fact-finding for determining objective aspects.

③ The difference between appellate court decision and trial court decision (5.1) lies in findings on establishment of experimental conditions above: the appellate court found that it had been "proposed by A with reference to C's advice," while the trial court found it had been "proposed by C." ((5.1) (2) ①) Both trial court and appellate court found the person who made the proposal was the inventor.

(2) Analysis Based on Discussions in This Study

Here we consider whether C, not Appellant (Plaintiff), can be deemed as a directly-involved joint inventor. (Fig. 5 ①)

① As we have discussed in (3.4) (2) ①, when experiments are outsourced, the outsourcing company usually requests implementation of prescribed experiments only and the

outsourced company simply conducts requested experiments and reports the results. There is no common purpose (intention) of the outsourcing party and outsourced party to collaborate with each other "for the progress of research and development (completion of an invention)." In this respect, the trial court decision finding C as an inventor is inappropriate.

Appellate court eliminated such inappropriateness by eliminating C from inventorship on the ground that the extent of C's advice was not necessarily sufficient. "Advice" is one of the modes of subjective engagement as discussed in (3.1), and whether it amounts to subjective engagement in a joint invention will depend on the technical contents of the advice. C, however, is deemed to have considerably contributed to the setting of experimental conditions as the trial court noted.

② Accordingly the reality would be reflected more accurately if C were eliminated from inventorship on the ground that C did not satisfy the requirements for subjective aspects, due to lacking in purpose (intention).⁵⁹ In some cases, objective aspects and subjective aspects could become closer to each other.

⁵⁹ If, as in the trial court decision, C is deemed as the only inventor, Pfizer's patent/patent application which is now deemed filed by a person who has no right to receive patent, gives rise to the issue of usurped application which can constitute reasons for rejection under Article 49(vii) of Patent Law, reasons for patent invalidation (Article 123(1)(vi) of Patent law). Recognizing both C and A as joint inventors will also cause reasons for rejection or patent invalidation as mentioned in (3.5).

(5.5) Decision on September 13, 2005 by Tokyo District Court⁶⁰
(Pfizer's "divisible drug tablet" case)

(1) Outline

Plaintiff and Defendants are the same as (5.1). With respect to patented invention "film-coated divisible tablet" (JP3015677), Plaintiff requested Defendant to pay 1 billion yen as a reasonable compensation for the employee invention. The court denied inventorship of Plaintiff and dismissed the request.

(2) Decision (Summary)

Plaintiff "merely gave general direction to D who had been working under Plaintiff as the manager of Formulation Research Group. Thus, because Plaintiff only carried out general management task toward the inventor (author's note: D), Plaintiff is not deemed to have actually contributed to creation of technical ideas to be recognized as a joint inventor."

(3) Analysis Based on Discussions in This Study

① This is the case of an indirectly-involved joint invention where a contributor's subjective engagement was not enough to be recognized as a joint inventor. (Fig. 6②)

② The term "contributed" used in the court decision seems to imply an indirectly-involved joint invention. The court noted

⁶⁰ 1916 Hanrei Jihō 133 (Tokyo D. Ct. Sept 13, 2005); 1214 Hanrei Taimuzu 283.

that subjective engagement was not satisfactory because Plaintiff "merely gave general direction." (mere manager⁶¹) The "actual contribution" required by the court decision should be considered as "subjective engagement whose contribution is at least similar that the inventors made in the objective aspects." (See (3.4)(1))

③ Claimed invention is a physical-object invention basically characterized by the shape of divisible tablets, but is considered to have the aspect of a material invention also as it is relating to the property of coating film for the tablets.⁶²

⁶¹ See supra note 24.

⁶² The claimed invention, divisible tablets, have a concave on the top surface and convex on the bottom surface of tablet, forming a curved surface with different curvature radius (one on top surface is smaller). This way the center of the tablet is made thinner than peripheral area, and with a cleavage line on top it is made so as to be easily divided when it is placed upside down and pressed from top. Claimed invention is relating to the divisible tablet and film-coating to protect such tablet from light etc.

6. Results, Evaluation and Treatment in Research and Development

Contribution of researchers and engineers who engage in research and development activities by which results, especially inventions, are obtained, must be objectively evaluated and the researchers and engineers must be reasonably treated.

Such evaluation requires objective analysis of the situation and application of reasonable standards. That is to say, the following procedure needs to be taken: setting standards → analysis → evaluation → treatment.

Such a system will further motivate researchers and engineers to engage in research and development activities, which will lead even better results.⁶³

Meanwhile, as mentioned in (2.5) above, since Article 35 of Patent Law provides a system of a reasonable compensation for an employee invention, the issue of evaluation and treatment of an invention come forward. For businesses to

⁶³ To this end, it will be important for people concerned to discuss on the system indicated above, especially reasonable evaluation standards, and promote the results through education and PR activities.

increase their earnings by promoting research and development, they must introduce an appropriate evaluation and treatment system not only for inventions but also for research and development before invention, for applications after invention, and further for commercialization.

In that sense, it is reasonable to establish, besides evaluation and treatment of inventions as in a conventional invention reward system, a comprehensive technical evaluation system as illustrated in the following Figure 11 under which achievement and contribution of not only B but also A, C and D are comprehensively evaluated during the process of implementing technologies. Evaluation of inventions and recognition of an inventor will serve as the starting point.

Figure 11

With respect also to the stages of application and commercialization of inventions, it seems that conception and its embodiment and, as their respective cores, "conception based on a principle" and "establishment of a model" are present. As the stages come near application/commercialization, more weight will be given to the model and less to conception, and principles of application will be used more than basic principles. Thus, besides physical/chemical concepts, rather social, economic and mental concepts are also likely to be added.

① Purpose of invention (Problems to be Solved)	- I want to fly.
② Formation stages of invention	
(a) Conception (Proposal of concept)	
(i) Mere intuition	- Try to fly like a bird.
(ii) Conception based on a principle	- Advance an object and use air resistance to float (Use propulsion to make air resistance and provide lift)
(b) Embodiment of concept	
(i) Establishment of a model	- Attach a motor to an object to rotate propellers and think about the shape of wings
(ii) Experiments/ calculation	- experiments: a. start with parts such as propellers and wings b. model of body c. proceed to the full-size body - Obtain necessary experiment results and formulas
(iii) Modification of model	
(iv) Completion by repeating process from (i) to (iii)	- applicability

Fig. 1 Purpose of Invention, Formation Stages of Invention (Invention of Airplane)

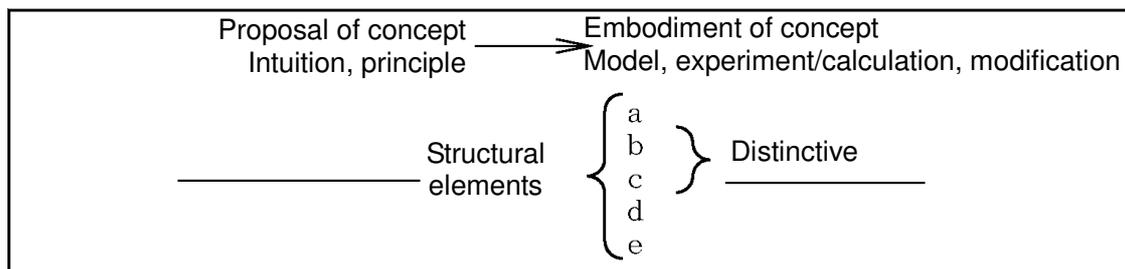


Fig. 2 Formation Stages of Invention and (Distinctive) Structured elements

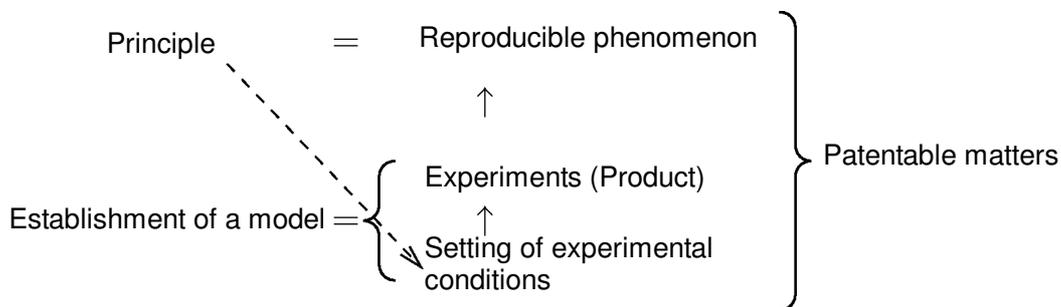
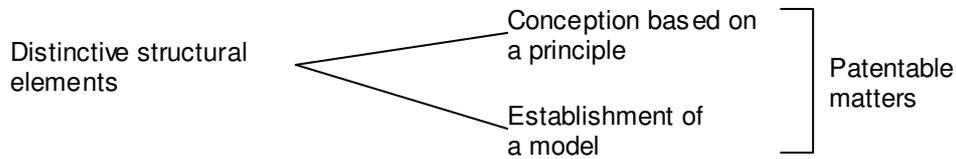
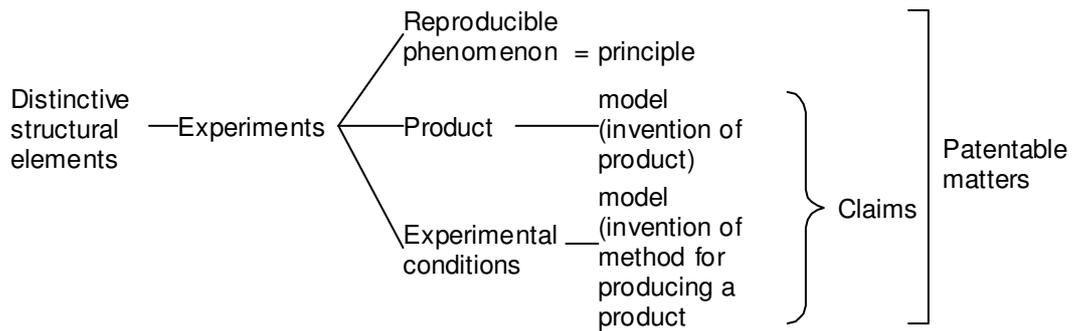


Fig. 3 Discovery of Reproducible Phenomenon by Experiment and Principle/Model

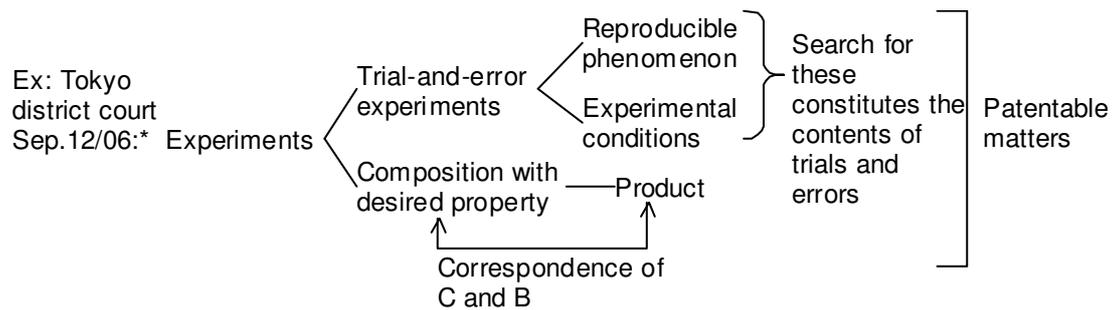
A. Author's Theory: a principle is understood



B. Author's Theory: a principle is hard to find and invention is found by experiment.



C. Relation with trial-and-error experiments defined by court decisions



* supra note 18

Fig. 4 Trial-and-error experiments and Reproducible phenomenon, experimental conditions and product

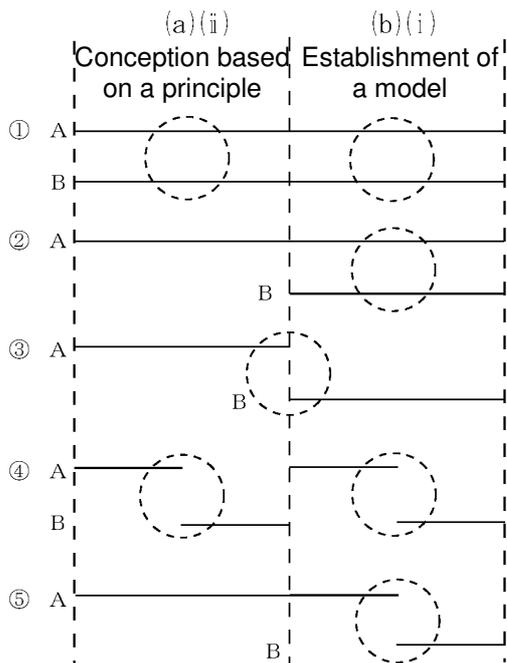


Fig. 5 Example of directly-involved joint invention

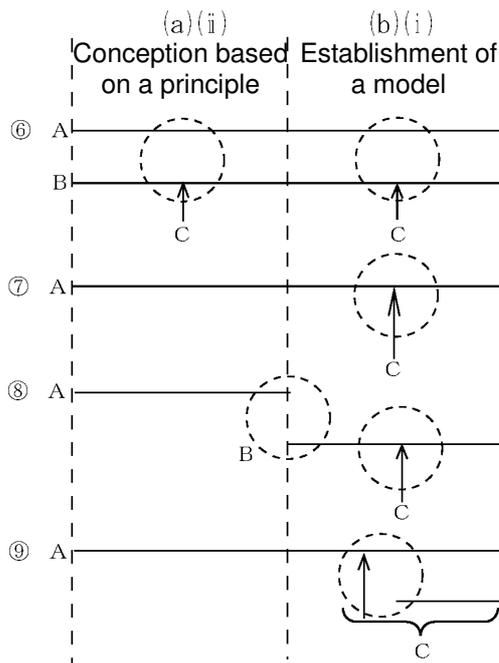


Fig. 6 Example of indirectly-involved joint invention (except ⑩ which is a mixed type)

Indirect type	Subjective aspects (subjective engagement)	
Direct type	Objective aspects	Subjective aspects (subjective engagement)

Fig. 7 Directly/Indirectly-involved joint invention and objective/subjective aspects

A	B	C	Inventor	Court decision
Physical	Principle and model are distinguishable because they are easy to perceive and the principle is simple.	a. Model is easily anticipated from principle	Person who conceived the principle	(5.5)
		b. Model is difficult to be anticipated from principle (beyond scope of anticipation) (model is established through experiments etc.)	Person who conceived the principle Person who established a model	
Material	c. Because principle is difficult to be found, reproducible phenomenon rather than principle is sought through experiments etc. (integration of principle/model) d. Principle and model are distinguishable. Ex: Procedure from principle to model is established	(No problem exists in anticipating model from principle.)	Person who conducted experiments relating to integrated principle and model	(5.1) (5.2)
		In most cases model is difficult to be anticipated from principle.	Person who conceived the principle Person who established a model	(5.3)

Fig. 8 Recognition of Inventor by means of Physical-Object and Material Invention (Objective Aspects)

A. Technical field (use)	B. Principle	C. Creation of technical ideas
Architecture/Civil Engineering	Physics	Physical-object
Machinery	Physics	Physical-object
Electronics	Physics	Physical-object/ Material
Chemistry	Chemistry	Material
Pharmaceuticals/ Food	Chemistry	Material

Fig. 9 Categorization of Invention by Technical Field, Principle, and Physical-Object/Material System

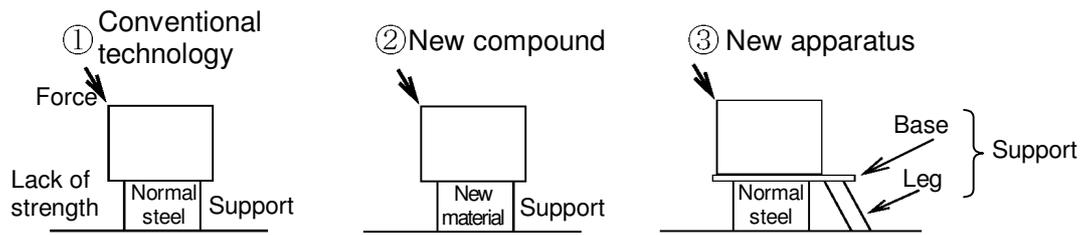


Fig. 10 Invention of New Material (Material Invention) and New Apparatus
(Physical-Object Invention)

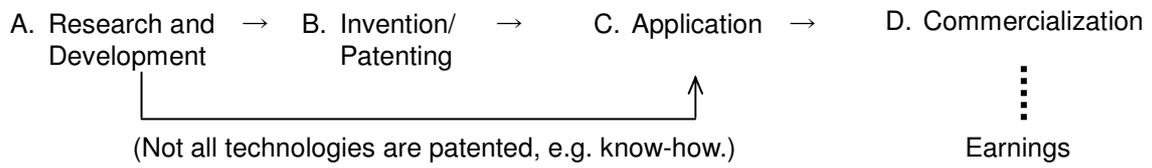


Fig. 11 Implementing Process and Evaluation of Technology

		Objective aspects	Subjective aspects
Direct type	Issues	Whether “conception based on a principle” or “establishment of a model” was carried out	Whether there was subjective engagement among those who carried out “conception based on a principle” or “establishment of a model”
	Example	(5.1) Pfizer’s “fine-grained core” case (trial court) (5.2) Toshiba’s “photoelectric surface” case (5.3) Otsuka Pharmaceutical’s “drug discovery” case	(5.4) Pfizer’s “fine-grained core” case (appellate court decision of (5.1))
Indirect type	Issues	/	Whether there was subjective engagement between contributor and inventor who carried out “conception based on a principle” or “establishment of a mode”
	Example		(5.5) Pfizer’s “divisible tablet” case

Table 1. Objective/ Subjective Aspects of Directly/Indirectly-involved joint invention and Examples of Issues