Patent Right	Date	October 2, 2019	Court	Intellectual Property High Court, First Division
	Case number	2018 (Gyo-Ke) 10108		
- A case in which the court has determined that there is a motivation to apply the Exhibit Ko 2 technique to the cited invention; however, the constitution according to the different feature is not conceivable by such application, and thus it cannot be said that the Invention was easily conceivable on the basis of the cited invention.				

Case type: Rescission of Appeal Decision of Refusal

Result: Granted

References: Article 29, paragraph (2) of the Patent Act

Number of related rights, etc.: Patent Application No. 2014-508992, Appeal against Examiner's Decision of Refusal No. 2016-15650

Summary of the Judgment

1. This case is a suit against the appeal decision made by JPO that dismissed the request for appeal with regard to the case of the appeal against the examiner's decision of refusal for the invention, titled "A TREATMENT DEVICE FOR WASTE MATTER CONTAINING HEAVY METALS AND A METHOD FOR TREATING WASTE MATTER CONTAINING HEAVY METALS USING SAME".

Plaintiff alleges the errors in the determination of inventive step as a reason for rescission.

2. The court decision has rescinded the JPO decision in summary as follows:

(1) Errors in the findings of Cited Invention

The appeal decision finds the subject to be treated of the cited invention as "organic waste ", whereas in comparison to the Invention, it finds "a slurry or solid organic waste including solid organic waste and heavy metals" as a common feature in reference to well-known techniques, whereas Cited Reference 1 fails to describe comprising heavy metals in organic waste, and thus this feature is not a common feature. There is no dispute about the above between the parties, and it must be said that the appeal decision made an error in the finding of common features and accordingly, an error in the finding of Different Features 1, 2.

Of course, it cannot be necessarily inferred that if there were an error in the finding of common features and different features it would affect the conclusion of the appeal decision. Thus a further consideration is given as to whether or not the Invention was easily conceivable on the premise of Different Features 1', 2' as the court has found.

(2) Whether Different Feature 2' was easily conceivable

A technical field between the cited invention and the Exhibit Ko 2 technique relates to the treatment of a waste utilizing hydrothermal reaction, and thus they are related to each other.

According to the description of well-known reference, "organic waste", a subject for the treatment in the cited invention, also comprises heavy metals, and the prevention of the elution is a problem that a person ordinarily skilled in the art should naturally consider in the technical field of the cited invention. Although Cited Reference 1 focusing on the separation between a waste and a liquid after treatment does not explicitly describe the prevention of elution, it should be inherent as an obvious problem to be solved by the cited invention. Further, the Exhibit Ko 2 technique has an objective to prevent the elution of heavy metals from a heavy metal-containing drainage after hydrothermal treatment, and thus shares its problem to be solved with the cited invention.

However, even if the Exhibit Ko 2 technique should be applied to the cited invention, Exhibit Ko 2 fails to describe the formation of tobermorite structure as a layer on a solid of said organic waste. Thus a person ordinarily skilled in the art would not conceive of "$5CaO \cdot 6SiO_2 \cdot 5H_2O$ crystal (tobermorite) structure in which said heavy metals are entrapped" according to Different Feature 2' being "formed" as "a layer" "on a solid of said organic waste".

For the above reason, a person ordinarily skilled in the art would not conceive of the constitution according to Different Feature 2' by applying the Exhibit Ko 2 technique to the cited invention, and thus it cannot be said from the reasons of the appeal decision that the Invention was easily conceivable on the basis of the cited invention and the Exhibit Ko 2 technique.

Judgment rendered on October 2, 2019
2018 (Gyo-Ke) 10108 A case of seeking rescission of the JPO decision
Date of conclusion of oral argument: August 21, 2019

Judgment

Plaintiff: G-8 INTERNATIONAL TRADING

Defendant: Commissioner of the Japan Patent Office

Main text

1. The decision rendered by the JPO on Appeal against Examiner's Decision of Refusal No. 2016-15650 on June 12, 2018 shall be rescinded.
2. Defendant shall bear the court costs.

Facts and reasons

No. 1 Claim

The same as the main text

No. 2 Outline of the case

1. History of the procedures, etc. in Japan Patent Office

(1) Plaintiff filed on April 4, 2012 an international patent application with regard to the invention titled "A TREATMENT DEVICE FOR WASTE MATTER CONTAINING HEAVY METALS AND A METHOD FOR TREATING WASTE MATTER CONTAINING HEAVY METALS USING SAME", and then entered into national phase (Patent Application No. 2014-508992, number of Claims: 5, Exhibit Ko 10).

(2) Plaintiff received a decision of refusal on July 15, 2016, and thus filed an appeal for this on October 20 of the same year, and Japan Patent Office examined this as Appeal against Examiner's Decision of Refusal No 2016-15650. Plaintiff made an amendment on April 4, 2018 by a written amendment to amend the scope of the claims (number of claims: 5, Exhibit Ko 11).

(3) Japan Patent Office made an appeal decision on June 12 of the same year to the effect that "The appeal of the case was groundless." as described in the attached written appeal (copy) (hereinafter referred to as "the appeal decision") and its certified copies were served for Plaintiff on July 4 of the same year.

(4) Plaintiffs filed a suit for the case seeking for rescission of the appeal

decision on August 1 of the same year.

2. The recitation of the Claims

The recitation of Claim 2 of the scope of claims subject to the appeal decision is set forth as below (Exhibit Ko 11). In addition, the symbol "/" in the text indicates a part of carriage return in the original text (the same shall apply hereinafter). Hereinafter, the invention according to Claim 2 after said Amendment is referred to as "the Present Invention", and the description is referred to as "the Description" including the drawing (Exhibit Ko 12, further, Exhibit Ko 10 for drawing.).

[Claim 2] A method for treating waste including heavy metals, comprising the steps of: storing a slurry or solid organic waste including solid organic waste and heavy metals and a sufficient amount of Ca component raw material and SiO_2 component raw material that can form $5CaO \cdot 6SiO_2 \cdot 5H_2O$ crystal (tobermorite) for entrapping at least said heavy metals into $5CaO \cdot 6SiO_2 \cdot 5H_2O$ crystal (tobermorite) structure in a carbonizing treatment of said organic waste inside a sealed container having an opening/closing discharging port and a closed space. /stirring and mixing said Ca component materials and SiO_2 component raw materials, while grinding said solid organic waste, /spraying high-temperature and high-pressure water vapor for the formation of a layer of $5CaO \cdot 6SiO_2 \cdot 5H_2O$ crystal (tobermorite) structure in which said heavy metals are entrapped on a solid of said organic waste by spraying high-temperature and high-pressure water vapor to said solid organic waste and Ca component raw material and SiO_2 component raw material that are contained in a sealed container and are being ground and mixed by said stirring means /a step for cooling steam in a sealed container after treatment to form a treated liquid including a water-soluble compound of said heavy metals /and separating and recovering a treated liquid including a water-soluble compound of said heavy metals and a treated waste including tobermorite in which said heavy metals are entrapped.

3. Summary of reasons of trial decision

(1) The reason for trial decision is as per the attached written trial decision (copy). In summary, the Invention was easily conceivable on the basis of the invention described in Cited Reference 1 of the following A and the technique described in Cited Reference 2 of the following B, and thus the Invention cannot be granted a patent under the provision of Article 29, paragraph (2) of the Patent Act.

A. Cited Reference 1: International publication No. 2006/126273 (Exhibit Ko 1)

B. Cited Reference 2: Unexamined Patent Application Publication No. 2008-689 (Exhibit Ko 2)

(2) The invention described in Cited Reference 1 as the appeal decision found (hereinafter referred to as "Cited Invention") and the common features and different features between the Invention and the cited invention are set forth below.

A. Cited Invention

A method for separating and recovering a liquid of organic waste, comprising the steps of: storing organic waste inside a sealed container having a closed space as well as a discharging port having an opening/closing mechanism; grinding and stirring solid organic waste; spraying high temperature and high pressure steam for carbonization; and taking out treated waste and a liquid in a separated state.

B. Common features and Different features

(Common Feature)

A method of treating waste including heavy metals, comprising the steps of: storing a slurry or solid organic waste including solid organic waste and heavy metals inside a sealed container having an openable discharging port and a closed space, /stirring and mixing while grinding said solid organic waste, /ejecting high-temperature and high-pressure water vapor by spraying high-temperature and high-pressure water vapor onto said solid organic waste that is contained in a sealed container and is being ground and mixed by said stirring means, /and separating and recovering a treated liquid and treated waste.

(Different Feature 1)

The Invention treats "organic waste" and "a sufficient amount of Ca component raw material and SiO_2 component raw material that can form $5CaO \cdot 6SiO_2 \cdot 5H_2O$ crystal (tobermorite) for entrapping at least said heavy metals into $5CaO \cdot 6SiO_2 \cdot 5H_2O$ crystal (tobermorite) structure in a carbonizing treatment of said organic waste", whereas the Cited Invention treats "(slurry or solid) organic waste (including solid organic waste and heavy metals)".

(Different Feature 2)

In the Invention, "$5CaO \cdot 6SiO_2 \cdot 5H_2O$ crystal (tobermorite) structure in which said heavy metals are entrapped" produced from "solid organic waste and Ca component raw material and SiO_2 component raw material" is "formed" as "a layer" "on a solid of said organic waste", whereas in the Cited Invention, "(slurry or solid) organic waste (including solid organic waste and heavy metals)" is carbonized.

(Different Feature 3)

The Invention comprises "a step for cooling steam in a sealed container after treatment to form a treated liquid including an aqueous compound of said heavy metals" "in which steam at a high temperature and a high pressure is sprayed",

whereas it is not clear whether or not the Cited Invention comprises the step.

(Different Feature 4)

The Invention produces "a treated liquid including a water-soluble compound of said heavy metals" and "treated waste including tobermorite in which said heavy metals are entrapped", whereas the Cited Invention produces "treated waste and a liquid".

(3) A technique described in Cited Reference 2 as the appeal decision found (hereinafter referred to as "the Exhibit Ko 2 technique") is set forth below:

The addition of calcium compound and silica in "a sufficient amount that can suppress the elution of heavy metals" so as to produce "crystalline calcium silicate (calcium silicate) such as tobermorite" by subjecting "waste containing heavy metals" to a "hydrothermal treatment" in a sealed container, so that "heavy metals are entrapped inside (immobilized) to suppress the elution to the outside", and "hydrothermal treatment" is "implemented for 1 to 48 hours in the presence of saturated steam at 130 to 300°C", thereby "growing a crystal and producing high-strength tobermorite" and "the effect of suppressing the elution is promising".

4. Reasons for rescission

Errors in the determination of inventive step

(omitted)

No. 4 Judgment of this court

1. As for the present invention

(1) The description of the specification

The Claims of the present invention are set forth as in the aforesaid No. 2-2. The Detailed Description of the Invention of the description has the following descriptions (see the list of the description and drawings of the attachment for the drawings cited in the following description.):

A. Technical Field

[0001] The Invention relates to an apparatus for treatment of waste including heavy metals and a method for treating waste including heavy metals using the same, comprising the steps of: treating waste including heavy metals such as sewage sludge, industrial sludge, medical waste, household waste, industrial waste, and the like using steam at a high temperature and a high pressure; and discharging and separating a mixture including the treated and immobilized waste including heavy metals and a liquid after the treatment.

B. Background Art

[0002] ... In a method of treating conventional waste with steam, almost no harmful nitrogen oxide and sulfur oxide are produced as in the case of combustion treatment, which has no problem in environmental pollution and allows us to expect safe waste treatment.

[0003] However, a treated solid and a liquid are mixed together in a container after treatment, which causes a problem of inconvenience and difficulty in transportation, storage, etc. after treated waste is taken out. Furthermore, a treated solid and a liquid are separated by use of a separator after treatment, which complicates a treating process, requires great efforts, takes a long time for treatment, and requires a large area for separately disposing a reactor and a separator.

[0004] Provided is an apparatus for treatment which can safely treat waste in one apparatus by means of steam at a high temperature and a high pressure, and can separate and recover continuously the treated waste and a liquid by means of a simple operation (See Patent Document 2). However, this treatment apparatus necessitates a reactor consisting of a sealed container for the treatment of waste with high-temperature and high-pressure water vapor and another sealed container for recovery connected to said reactor consisting of the former sealed container for the recovery of a separated liquid, which causes problems of high facility cost and complicated operation.

[0005] Meanwhile, for example, sewage sludge discharged from sewage treatment facility includes pathogenic microbes and heavy metals. To avoid an environmental risk thereby, various methods such as concentration, digestion, dehydration, composting, combustion, and melting have been implemented. However, these treatment methods are consumption-type techniques that require a large amount of electricity or heat energy and have a great impact on the environment and can become a discharging source of greenhouse effect gas and only reduce and dispose of waste. These are not treatments in compliance with a recycling principle of resources but become a cause weighing on the local economy due to high maintenance cost.

C. Problem to be solved by the invention

[0012] ... A second object of invention is to provide a method for treatment of waste including heavy metals, capable of easily treating waste including heavy metals using steam at a high temperature and a high pressure; discharging a mixture including the waste in which heavy metals are immobilized to suppress the elution, as well as a liquid; and separating them for recovery with a simple operation.

D. Means for solving the problem

[0014] A second aspect of the Invention is a method for treating waste including heavy metals, comprising the steps of: implementing a treatment in the presence of a sufficient amount of Ca component raw material and SiO_2 component raw material that form $5CaO \cdot 6SiO_2 \cdot 5H_2O$ crystal (tobermorite) for entrapping at least said heavy metals into $5CaO \cdot 6SiO_2 \cdot 5H_2O$ crystal (tobermorite) structure in a treatment of said sealed container in treating waste including heavy metals in a sealed container having an openable discharge port and a closed space while ejecting high-temperature and high-pressure steam; and cooling, thereby separating and recovering a liquefied treated liquid including a water-soluble compound of said heavy metals and treated waste including tobermorite in which said heavy metals are entrapped.

E. Detailed description of the preferred embodiments

[0036] When treated by supplying waste including heavy metals in a sealed container 12 having an openable discharge port 16 and a closed space S1 shown in Figure 1 and ... a sufficient amount of Ca component raw material and SiO_2 component raw material that can form $5CaO \cdot 6SiO_2 \cdot 5H_2O$ crystal (tobermorite) for entrapping said heavy metals into $5CaO \cdot 6SiO_2 \cdot 5H_2O$ crystal (tobermorite) structure, while ejecting high-temperature and high-pressure steam (120 to 250°C, 1.1 to 2.1 MPa for 1 to 8 hours)..., in treating under saturated vapor pressure, a Ca component originally included in waste and newly added Ca component and SiO_2 component originally included in waste and newly added SiO_2 component are subjected to hydrothermal reaction according to the following formula (3) to form a mineral crystal referred to as a stable calcium silicate (tobermorite: $5CaO \cdot 6SiO_2 \cdot 5H_2O$).

[0037] $6SO_2+5CaO+5H_2O \rightarrow 5CaO \cdot 6SiO_2 \cdot 5H_2O$ ⋯Formula (3)

[0038] A tobermorite crystal repeats an Si-O tetrahedral layer, a Ca-O octahedral layer, an Si-O tetrahedral layer as schematically shown in Figure 4 to form a structure grown in layers in which calcium ion is intercalated between an Si-O tetrahedral layer and an Si-O tetrahedral layer.

Further, in a process of forming this laminar crystal structure, heavy metals substitute calcium ion through an ion exchange reaction with said calcium ion to be taken and entrapped into a laminar crystal structure. Heavy metals are taken into a laminar crystal structure of tobermorite and entrapped, thereby suppressing the elution.

[0039] Said subcritical water reaction condition (temperature, pressure, time) is significant. Further, it is essential to utilize such a subcritical water reaction condition that can form a laminar crystal structure of tobermorite by treating waste and can cause heavy metals to substitute calcium ion through an ion exchange

reaction with said calcium ion to be taken and entrapped into a laminar crystal structure of tobermorite in a process of forming a laminar crystal structure.

[0040] Figure 5 is a schematic diagram that illustrates a state in which chromium and lead are taken and entrapped into a laminar crystal structure of tobermorite when subjecting polluted soil including chromium and lead as heavy metals to a hydrothermal reaction while ejecting high-temperature and high-pressure steam as in the aforesaid manner by newly adding an SiO_2 component and CaO as a new Ca component so as to satisfy the aforesaid formula (3) by use of the SiO_2 component preliminarily included in this polluted soil.

[0041] Chromium and lead are changed into chromium ion and lead ion when subjected to high-temperature and high-pressure steam as in the aforesaid manner (120 to 250°C, 1.1 to 2.1 MPa for 1 to 8 hours), and CaO is changed into calcium ion. Further, the SiO_2 component preliminarily included in polluted soil and the newly added SiO_2 component are changed into a silica ion to transition into a surface reaction layer 81 of a soil particle 80 and conduct hydrothermal reaction to form a tobermorite laminar crystal layer 82 on a surface of the soil particle 80. In a process of forming this laminar crystal structure, chromium ion and lead ion substitute calcium ion through an ion exchange reaction with said calcium ion to be taken and entrapped into a laminar crystal structure of tobermorite.

[0049] When waste is treated while ejecting high-temperature and high-pressure steam in the aforesaid manner, a greater part of heavy metals are taken and entrapped into a laminar crystal structure of tobermorite as in the aforesaid manner, whereas heavy metals may sometimes be dissolved into steam or water in the presence of negatively charged ions such as chlorine ions, silicate ions, carbonate ions, sulfate ions, and phosphate ions in said waste.

[0050] Therefore, the Invention treats waste in a sealed container 12 while ejecting high-temperature and high-pressure steam, cools the sealed container 12 by a cooling means 70, and liquefies steam in a closed space S1 to form a treated liquid including a water-soluble compound of said heavy metals, separating and recovering this liquid and treated waste including tobermorite in which said heavy metals are entrapped.

[0090] This allows a liquid in a state of including bacteria, odor components, etc. included in waste to be subjected to high-temperature and high-pressure steam along with the waste. Further, a liquid to be separated and recovered after treatment includes a water-soluble compound of heavy metals, and odor and harmful components may be recovered in a decomposed state, thereby eliminating a need for

secondary treatment of a separated and recovered liquid, which otherwise takes efforts and time.

However, in a case where a water-soluble compound of heavy metals needs to be separated from a liquid, a secondary treatment is required.

[0091] ... Regarding the action of an apparatus for treatment of waste including heavy metals according to the embodiment, an explanation is given together with a method of recovering a liquid according to the embodiment. According to the present embodiment, the waste to be treated including heavy metals may include, for example, medical waste which is disposed from medical institutions such as hospitals, universities, and other research institutes, and include blood, operated internal organs, absorbent cotton, disposable diapers, blood feeding tubes, intravenous bottles, resin injection syringes, and the like.

[0092] Note that metals such as needles and glass-made objects are separated in advance and removed. ...

[0093] Ejected steam causes the inside of the sealed container 12 to assume a high-temperature and high-pressure state of e.g. 250°C and 2.1 MPa.

[0094] ... A treatment causes Ca component originally included in waste and a newly added Ca component, and an SiO_2 component originally included in waste and a newly added SiO_2 component to be subjected to hydrothermal reaction to form a mineral crystal having a laminar structure referred to as a stable calcium silicate ($5CaO{\cdot}6SiO_2{\cdot}5H_2O$ tobermorite). In a process of forming this laminar crystal structure, heavy metals are taken and entrapped into a laminar crystal structure.

[0095] The greater part of heavy metals is taken and entrapped into a laminar crystal structure of tobermorite in the aforesaid manner, whereas heavy metals are dissolved into steam or water in the presence of negatively charged ions in said waste.

Further, a disease agent included in (or attached to) waste is sufficiently sterilized and treated while decomposing odor substances, etc.

Further, moisture included in waste is treated along with the waste with high-temperature and high-pressure steam in the treatment. When such treatment is conducted for a required time, e.g., about 40 minutes, organic substance in waste is treated with a carbon state ground into a particulate having a size of, e.g. 0.3 to 0.8 mm.

[0097] Treated waste is separated from, e.g., a liquid, and organic substances are carbonized to form tobermorite in which heavy metals are entrapped and a treated soil particle, capable of being recovered in a state easy to handle for transportation and management.

[0103] A solidification characteristic of heavy metals was tested through a subcritical water treatment of sewage dehydration sludge including heavy metals...

[0104] Regarding raw material sewage dehydrated sludge as well as sludge including tobermorite in which said heavy metals are entrapped and a liquid including a liquefied component for 30 samples in total, ... a laboratory analysis of general organic components including fertilizer components as well as heavy metals and minute chemicals was conducted.

[0115] All samples were subjected to a subcritical water treatment, and it was found that an organic fertilizer (including compost) could be safe with a level of heavy metals below not only a soil environmental criterion but also an agricultural criterion.

[0116] Applying "subcritical water treatment technique" to sewage sludge shows that it is possible to solidify heavy metals to a harmless level and suppress the elution. Specifically, it has been demonstrated that an agricultural criterion for heavy metals may be satisfied with respect to sewage sludge including a maximum level of heavy metals in the past, and sludge may be safely changed into a fertilizer directly and in a short time.

(2) According to the aforesaid item (1), the Invention is summarized as below.

A. The Invention relates to a method for treatment of a waste including heavy metals, comprising the steps of: treating waste including heavy metals such as sewage sludge, medical waste, household waste, industrial waste, and the like using steam at a high temperature and a high pressure; and discharging and separating a mixture including the immobilized waste including heavy metals and a liquid. ([0001])

A goal of invention is to provide a method for treatment of waste including heavy metals, capable of easily treating waste including heavy metals using steam at a high temperature and a high pressure; discharging a mixture including the waste in which heavy metals are immobilized to suppress the elution, as well as a liquid; and separating them for recovery. ([0012])

B. While ejecting high-temperature and high-pressure steam and supplying a sufficient amount of Ca component raw material and SiO_2 component raw material as well as waste including heavy metals in a sealed container 12, a treatment of subcritical water reaction or hydrothermal reaction was conducted (120 to 250°C, 1.1 to 2.1 MPa for 1 to 8 hours) to form a crystal of stable calcium silicate (tobermorite) as shown by the following formula (3).

$6SiO_2+5CaO+5H_2O \rightarrow 5CaO\cdot 6SiO_2\cdot 5H_2O$ ... Formula (3)

A tobermorite crystal repeats an Si-O tetrahedral layer, a Ca-O octahedral layer,

an Si-O tetrahedral layer so as to form a structure grown in layers in which calcium ions are intercalated between an Si-O tetrahedral layer and an Si-O tetrahedral layer. In a process of forming this laminar crystal structure, heavy metals substitute calcium ion through an ion exchange reaction with said calcium ion, to be taken and entrapped into a laminar crystal structure. Heavy metals are taken into a laminar crystal structure of tobermorite and entrapped, thereby suppressing the elution. ([0036] to [0038], [0041])

When waste is treated while ejecting high-temperature and high-pressure steam, the greater part of heavy metals is taken and entrapped into a laminar crystal structure of tobermorite, whereas heavy metals may sometimes be dissolved into steam or water in the presence of negatively charged ions such as chlorine ions, silicate ions, carbonate ions, sulfate ions, and phosphate ions in said waste. The Invention treats waste in a sealed container 12, followed by cooling the sealed container 12 and liquefying steam in a closed space S1 to form a treated liquid including a water-soluble compound of said heavy metals; this liquid, and treated waste including tobermorite in which said heavy metals are entrapped are separated and recovered. ([0049], [0050])

Treated waste is separated from, e.g., a liquid, and organic substances are carbonized to form tobermorite in which heavy metals are entrapped and a treated soil particle, capable of being recovered in a state easy to handle for transportation and management. ([0097])

2. Reason for rescission (errors in the determination of inventive step)

(1) Cited Invention

A. Cited Reference 1 generally has the following description (see List of Drawings of Cited Reference 1 of the attachment with regard to the drawings and tables cited in the following description.):

[0001] The present invention relates to an apparatus for treatment of organic waste and a method for separating and recovering a liquid for treating an organic waste contained in medical waste, household waste, industrial waste, and the like using steam at a high temperature and a high pressure, and obtaining the treated waste and a liquid which are separated from each other after the treatment.

[0003] However, when wastes are treated by steam ..., since a part of a large amount of the steam present in the vessel is liquefied, or water originally contained in the wastes and the like is present, the treated solid and the liquid are thus present in a mixed state in the vessel. In this state with the coexisting liquid, the treated waste after removal is inconvenient for transportation, storage, and the like, and difficult in

handling. ... The treatment method according to Patent Document 1 includes a gas/liquid/solid separator ... independently of a reactor ..., which provides the treatment using the steam at the high temperature and the high pressure, and it is thus necessary to separate ash ..., treatment water ..., and the like after the treatment. ... raising such problems as (1) a high treatment cost due to independently necessary apparatuses such as a separator, (2) a large amount of labor due to the complex treatment step, ...

[0004] The present invention is devised in view of the foregoing problems and one of the objects thereof is to provide an apparatus for treatment of organic waste which can safely treat waste in only one apparatus by means of steam at a high temperature and a high pressure, and can continuously separate and recover the treated waste and a liquid by means of a simple operation. Moreover, another object thereof is to provide an apparatus for treatment of organic waste which has a simple structure, and can be manufactured at low cost. Further, another object thereof is to provide a method for simply separating and recovering treated waste and a liquid.

[0005] In order to achieve the above objects, the present invention provides an apparatus 10 for treating organic waste including a sealed vessel 12 that provides a closed space S1 for storing organic waste therein, steam jet means 14 that blows off steam into the sealed vessel 12 at a temperature and a pressure sufficiently high so that the waste can be carbonized, a discharge port 16 provided on a bottom side of the sealed vessel 12 with an openable mechanism 26, and separating and recovering means 18 that separates and recovers the treated waste and a liquid only by a direct discharge operation from the discharge port 16. ...

[0019] ... the waste can be safely treated in only one apparatus, and the treated waste and the liquid can be separated and recovered by means of the simple operation following the treatment. Especially, it is not necessary to bring the waste mixed with the liquid, which is difficult in handling, to the outside, so the waste can thus be separated and recovered directly from the sealed vessel used for the treatment, resulting in a simple and smooth operation. Moreover, the size of the overall apparatus does not increase, and thus the apparatus can be manufactured at low cost. Moreover, the recovered waste separated from the liquid contains a small amount of water, and is thus convenient for handling, transportation, management, and the like, and the carbonized waste can be processed into a fuel, a soil conditioner, and the like in a short period, for example.

[0029] Moreover, by means of the configuration where the apparatus includes the agitating means that agitates the waste in the sealed vessel, the waste can be

treated evenly and quickly.

[0035] ... An apparatus for treatment of an organic waste according to the present invention is an apparatus which uses steam at a high temperature and a high pressure to treat organic waste contained in medical wastes disposed from medical institutions such as injection syringes made of a synthetic resin, gauzes with blood, disposable diapers, and operated internal organs, as well as household wastes disposed from general households such as raw garbage, and containers made of synthetic resin such as plastic, and industrial wastes such as wastes from food processing, agricultural and fishery wastes, wastes of various industrial products, sewage sludge, and the like. ...

[0040] According to the present embodiment, the steam jet means 14 blows off the steam having the high temperature and the high pressure in the sealed vessel 12, and brings the inside of the sealed vessel 12 into a state having the high temperature and high pressure, thereby treating the waste using the steam. ... The temperature and the pressure of the steam blown off from the steam jet means 14 into the sealed vessel 12 are set sufficiently high so that the waste (mainly solid components) is carbonized. According to the present embodiment, the temperature and the pressure of the steam blown off from the steam jet pipe 28 are respectively set to approximately 180 to 250°C, and 15 to 35 atm, for example. The steam then brings the temperature and the pressure inside the sealed vessel 12 respectively to approximately 180 to 250°C, and 15 to 35 atm. ... Further, according to the present embodiment, an agitating blade 48 is attached to the steam jet pipe 28, and the steam jet pipe 28 also serves as a rotation shaft 49 of the agitating means. ...

[0041] The agitating means 30 is means which agitates the waste to be treated in the sealed vessel, and can treat the waste evenly and quickly. According to the present embodiment, the agitating means 30 includes ... the agitating blade 48 ... the agitating blade 48 includes a right-handed spiral blade 48a and a left-handed spiral blade 48b ... the spiral blades 48a and 48b agitate the waste while transporting the waste from the center portion toward both the end walls, and crushing the solid waste. ...

[0042] According to the present embodiment, the waste is carbonized by the treatment for a required period such as approximately 30 to 60 minutes, while the waste is being agitated at the high temperature and under the high pressure in the sealed vessel as described above. It should be noted that it is expected that the above treatment can decompose PCB contained in the waste, for example. For example, when waste or the like containing transformer oil was treated, it was confirmed that

the PCB concentration of 80 ppm before the treatment decreased to approximately 0.005 ppm after the treatment. A liquid accumulates in the sealed vessel 12 as a result of a part of the steam which is liquefied and water contained in the waste, and is mixed with the treated and carbonized waste.

[0049] ... According to the present embodiment, the waste to be treated includes medical waste which is disposed from medical institutions such as hospitals, universities, and other research institutes, and includes blood, operated internal organs, absorbent cotton, disposable diapers, blood feeding tubes, intravenous bottles, resin injection syringes, and the like. ...

[0052] The apparatus for treatment of an organic waste and the method for separating and recovering a liquid according to the present invention are used for treating synthetic resin wastes such as plastic, as well as raw garbage, and sewage sludge disposed from general households, medical institutions, plants, and treatment sites, for example.

B. The findings of Cited Invention

As seen above, Cited Reference 1 describes the Cited Invention (aforesaid No. 2-3(2)A) as the appeal decision found. There is no dispute between the parties in this regard.

C. Comparison between the Invention and the Cited Invention

(A) Comparing the Invention and the Cited Invention, the common features and the different features are set forth as below:

(Common Feature)

A method of treating organic waste including heavy metals, comprising the steps of: storing an organic waste inside a sealed container having an openable discharging port and a closed space/stirring and mixing solid organic waste while grinding /ejecting high-temperature and high-pressure water vapor by spraying high-temperature and high-pressure water vapor onto said solid organic waste, which are contained in a sealed container and are being ground and mixed by said stirring means, /and separating and recovering a treated liquid and treated waste.

(Different Feature 1')

The Invention treats "a slurry or solid organic waste including solid organic waste and heavy metals" and "a sufficient amount of Ca component raw material and SiO_2 component raw material that can form $5CaO \cdot 6SiO_2 \cdot 5H_2O$ crystal (tobermorite) for entrapping at least said heavy metals into $5CaO \cdot 6SiO_2 \cdot 5H_2O$ crystal (tobermorite) structure in a carbonizing treatment of said organic waste", whereas the Cited Invention treats "organic waste".

(Different Feature 2')

In the Invention, "$5CaO \cdot 6SiO_2 \cdot 5H_2O$ crystal (tobermorite) structure in which said heavy metals are entrapped" produced from "solid organic waste, slurry, or solid organic waste including heavy metals and Ca component raw material and SiO_2 component raw material" is "formed" as "a layer" "on a solid of said organic waste", whereas in the Cited Invention, "organic waste" is carbonized.

(Different Features 3, 4) As per the finding of the appeal decision (aforesaid No. 2-3(2)B).

(B) Further, the appeal decision finds the subject to be treated of the Cited Invention to be "organic waste", whereas in comparison to the Invention, it finds " a slurry or solid organic waste including solid organic waste and heavy metals" as a common feature in reference to well-known techniques (Exhibits Ko 3 to 7), whereas Cited Reference 1 fails to describe comprising heavy metals in organic waste, and thus this feature is not a common feature. Regarding the aforementioned, there is no dispute between parties. It must be said that the appeal decision made an error in the finding of common features and accordingly, an error in the finding of Different Features 1, 2.

Of course, it cannot necessarily be inferred that if there were an error in the finding of common features and different features it would affect the conclusion of the appeal decision. Thus further consideration is given as to whether or not the Invention was easily conceivable on the premise of Different Features 1', 2'.

(2) Description of Cited Reference 2

A. Cited Reference 2 discloses the following matters:

[0002] Soil and combustion ash containing harmful heavy metals pollute soil, underground water, river and seawater, etc. due to the elution of heavy metals upon contact with environmental water such as rainwater. Therefore, heavy metals in combustion fly ash are stabilized by the treatment such as a cement solidification, an addition of agents, and melt solidification, followed by a disposal by landfill.

[0005] The Invention was made with a focus on such circumstances, and its object is to provide a method for treatment of waste or an apparatus for treatment, capable of treating drainage containing heavy metals generated in a hydrothermal treatment without installing an effluent treatment facility in mixing calcium compound and water with waste including heavy metals, or subjecting to the hydrothermal treatment a mixture obtained by further mixing silica with them.

[0027] In a method for treatment of waste according to the Invention, a hydrothermal treatment step is a step that mixes calcium compound and water with

waste including heavy metals, or subjects to the hydrothermal treatment a mixture obtained by further mixing silica with them. ...

[0031] The hydrothermal treatment step causes silica (SiO_2) in heavy metal-containing waste or silica externally added and mixed to react with calcium compound by hydrothermal treatment to produce a crystalline calcium silicate (calcium silicate) such as tobermorite. This crystalline calcium silicate allows heavy metals in heavy metal-containing waste and heavy metals in a drainage mixed with the heavy metal-containing waste (heavy metal-containing drainage generated in hydrothermal treatment in a preceding hydrothermal treatment) to be entrapped inside (immobilized), thereby suppressing the elution to the outside.

[0034] ... Hydrothermal condition is suitably a reaction temperature of 130 to 300°C and a reaction time of 1 to 48 hours. In a case of a reaction temperature lower than 130°C, the crystal growth of tobermorite is insufficient, which makes it difficult to take the effect of suppressing the elution of heavy metals to a high level. In a case of a reaction temperature above 300°C, the crystal growth of tobermorite proceeds, and the effect of suppressing the elution may be expected, but the cost for treatment is excessively high, and thus it is not preferable from an economical viewpoint.

[0037] Consider the case where a mixture filled in a container for hydrothermal treatment is a mixture of calcium compound and clean water with waste including heavy metals, or a mixture obtained by further mixing silica with them. When heated after feeding water vapor to the aforesaid autoclave, a mixture filled in a container for hydrothermal treatment is hydrothermally processed. Water vapor condensed in this hydrothermal treatment becomes drainage, and a part of this drainage is contacted with a mixture to elute heavy metals from this mixture, which results in the generation of heavy metal-containing drainage (drainage containing heavy metals). This heavy metal-containing drainage is received by a receptacle, discharged to the outside of the autoclave via a pipe and decompression valve, and fed to a container for heavy metal-containing drainage. A residue of drainage (drainage not in contact with a mixture) is discharged to the outside of the autoclave via another pipe and decompression valve and fed to the other container (a container for heavy metal-free drainage).

B. According to the above A, Cited Reference 2 describes the Exhibit Ko 2 technique (aforesaid No. 2-3(3)) as the appeal decision found. There is no dispute between the parties in this regard.

(3) Whether Different Feature 2' was easily conceivable

A. Motivation

(A) Relationship in Technical Field

Cited Invention relates to "a method for separating and recovering a liquid for treating an organic material contained in medical waste, household waste, industrial waste, and the like using steam at a high temperature and a high pressure, and obtaining the treated waste and a liquid which are separated from each other after the treatment" (Exhibit Ko 1[0001]).

On the other hand, the Exhibit Ko 2 technique conducts "hydrothermal treatment" of "waste" such as "soil and combusted ash including heavy metals" (Exhibit Ko 2, [0004], [0005]).

Consequently, both technical fields relate to a treatment of a waste by use of hydrothermal reaction and relate to each other.

(B) Commonality of Problem

a. Cited Invention is intended for solving a problem to safely treat waste in only one apparatus by means of steam at a high temperature and a high pressure, and subsequently separate and recover the treated waste and a liquid by means of a simple operation (Exhibit Ko 1 [0004]). Cited Reference 1 discloses as organic waste for treatment "organic waste contained in medical wastes disposed from medical institutions such as injection syringes made of a synthetic resin, gauzes with blood, disposable diapers, and operated internal organs, as well as household wastes disposed from general households such as raw garbage, and containers made of synthetic resin such as plastic, and industrial wastes such as wastes from food processing, agricultural and fishery wastes, wastes of various industrial products, and sewage sludge" (Exhibit Ko 1 [0035]).

Unexamined Patent Application Publication No. 2006-55761 (Exhibit Ko 3) describes that "organic waste often includes heavy metals harmful for organisms that need to be insolubilized or removed." ([0003]), Unexamined Patent Application Publication No. 2011-31180 (Exhibit Ko 4) describes that "the Invention allows heavy metals, dioxins, nitrate, and agrichemicals including in soil, fertilizer, water, combustion ash, waste disposal of cattle, factory disposal, sludge, and sewage to be effectively decomposed and rendered harmless." ([0011]). Unexamined Patent Application Publication No. 2004-24969 (Exhibit Ko 5) describes that "heavy metals are often mixed in these wastes in cities and industrial waste. Therefore, when combusting wastes in cities and industrial waste, heavy metals such as zinc, lead, nickel, cadmium, and copper derived from a volatile metal compound in wastes of cities and industrial waste are contained in scattered fly ash or combustion ash entrained in exhaust gas. As seen above, the problem caused by the diffusion of

heavy metals is pointed out as a great social problem ..." ([0003]), and that "Conventionally, for disposal of fly ash and combustion ash generated in combusting waste, methods are taken to implement a humidifying treatment for the prevention of scattering, solidification with cement or asphalt for the use in landfill, or discharge to ocean. In a case of discharge to ocean, the Law requires solidification with cement or the like and the treatment for the prevention of elution of heavy metals. There are various problems for completely suppressing the elution of harmful metals from fly ash or combustion ash by these methods. Specifically, the above method allows heavy metals contained in fly ash or combustion ash to remain in a soluble state, which results in the elution of heavy metals over time even if fly ash or combustion ash should be solidified, and leaves the possibility of occurrence of secondary pollution. ..." ([0004]). Unexamined Patent Application Publication No. 2006-167509 (Exhibit Ko 6) describes that "this invention relates to a system for the treatment of fish and seafood residues wasted in a process of food processing, waste disposal of cattle such as poultry manure, pig feces, and cow manure, and agricultural waste such as vegetable waste, as well as organic waste including animal and plant residues such as food waste" ([0001]), and that "...fish and seafood residues contain not a small amount of heavy metals such as cadmium, mercury, and arsenic. If these are contained in fermented compost, such compost cannot be practically used for agricultural crops. ..." ([0005]). Unexamined Patent Application Publication No. 2008-155179 (Exhibit Ko 7) describes "an environmentally sound method for the heat treatment of a product to be treated including foul water such as disposal of cattle as well as factory sludge, construction sludge, or sludge such as sewage sludge or domestic drainage sludge, the method comprising separating and storing exogenous materials such as heavy metals in the product to be treated through carbonization and/or heat decomposition of organic substances in the product to be treated." ([Claim 1]).

According to these descriptions, it is recognized as a well-known matter as of the filing of the present application that not only industrial waste but also various wastes such as soil, fertilizer, water, combustion ash, waste disposal of cattle, factory disposal, factory or construction sludge, sewage and domestic drainage sludge, wastes in cities, and fish and seafood residues contain heavy metals as well as organic waste, and that if heavy metals included in waste are left, it cannot only be used as a fertilizer, but also a problem caused by the diffusion is pointed out as a great social problem, and that for a disposition of fly ash and combustion ash generated in combusting waste, measures such as a humidifying treatment, solidification, or

discharge to the ocean were taken for the prevention of scattering, and in a case of discharge to the ocean, the Law requires solidification with cement or the like and treatment for the prevention of elution of heavy metals.

Consequently, it is recognized as a problem that should be taken into account by a person ordinarily skilled in the art in a technical field to which the Cited Invention pertains that "organic waste" may include heavy metals, and such a problem is inherently present as an obvious problem to be solved by the Cited Invention even if Cited Reference 1 focusing on the separation between waste and a liquid after treatment does not explicitly describe the problem.

b. On the other hand, the Exhibit Ko 2 technique has an objective to provide a method for treatment of waste and an apparatus for treatment of waste capable of treating a drainage containing heavy metals generated in a hydrothermal treatment of waste containing metals without installing an effluent treatment facility ([0005]). The reaction of silica and calcium compound results in the generation of crystalline calcium silicate such as tobermorite, thereby "entrapping heavy metals inside (immobilized) and suppressing the elution to the outside" ([0031]). Thus it has an objective to prevent the elution of heavy metals from a heavy metal-containing drainage after hydrothermal treatment.

c. Consequently, it can be said that the Cited Invention and the Exhibit Ko 2 technique share a problem to be solved in that the elution of heavy metals in waste is prevented.

(C) Commonality of Function and Effects

Cited Invention contains organic waste in a sealed container having a closed space, stirs and grinds solid organic waste, and ejects high-temperature and high-pressure steam for carbonization. It discloses "a temperature of 180 to 250°C, and a pressure of 15 to 35 atm (Court's note: 1.5 to 3.5 MPa)" as a condition for hydrothermal treatment ([0040]).

On the other hand, the Exhibit Ko 2 technique forms crystalline calcium silicate such as tobermorite by hydrothermal treatment, and discloses a condition of hydrothermal treatment "saturated steam at 130 to 300°C (Court's note: 0.28 to 9.41 MPa by calculating pressure of saturated steam at the same temperature)" ([0034]).

Consequently, the Cited Invention carbonizes organic substances, whereas the Exhibit Ko 2 technique forms tobermorite crystal. They differ from each other in phenomena that take place by hydrothermal reaction. Thus there is no commonality of function and effects that would motivate us to combine the Exhibit Ko 2 technique with the Cited Invention. Of course, a hydrothermal treatment condition of

temperature and pressure itself overlaps. Thus it would not be a disincentive to combine.

(D) As aforementioned, the Cited Invention and the Exhibit Ko 2 technique are related to each other in technical field of hydrothermal treatment of waste and have in common a problem to prevent the elution of heavy metals from waste.

B. Application of the Exhibit Ko 2 technique to the Cited Invention

However, even if the Exhibit Ko 2 technique should be applied to the Cited Invention, Exhibit Ko 2 fails to describe the formation of tobermorite structure on a solid of said organic waste as a layer. Thus a person ordinarily skilled in the art would not conceive of "$5CaO \cdot 6SiO_2 \cdot 5H_2O$ crystal (tobermorite) structure in which said heavy metals are entrapped" according to Different Feature 2' being "formed" as "a layer" "on a solid of said organic waste".

In this regard, the appeal decision determined that if the Exhibit Ko 2 technique should be applied to the Cited Invention, "$5CaO \cdot 6SiO_2 \cdot 5H_2O$ crystal (tobermorite) structure in which said heavy metals are entrapped" would be "formed" to some extent as a "layer" "on a solid of said organic waste", whereas Defendant alleges that a person ordinarily skilled in the art could easily expect that the whole surface of produced granulate would be covered by a tobermorite crystal layer. However, although Unexamined Patent Application Publication No. 2002-320952 (Exhibit Ko 8) discloses coating a surface of polluted soil by tobermorite production ([0028], Figure 1; Figure 1 is as per the list of drawings of Exhibit Ko 8 of the attachment), it cannot be recognized as a well-known art from such description that tobermorite structure is "formed" "on a solid of said organic waste" as a "layer". There is no evidence in support of Defendant's allegation. Thus it cannot be said that the constitution of the invention according to Different Feature 2' was conceivable by applying the Exhibit Ko 2 technique to Cited Invention 1.

C. Summary

For the above reason, a person ordinarily skilled in the art would not conceive of the constitution according to the above Difference Feature 2' by applying the Exhibit Ko 2 technique to the Cited Invention, and thus it cannot be said from the reasons of the appeal decision that the Invention was easily conceivable on the basis of the Cited Invention and the Exhibit Ko 2 technique.

3. Conclusion

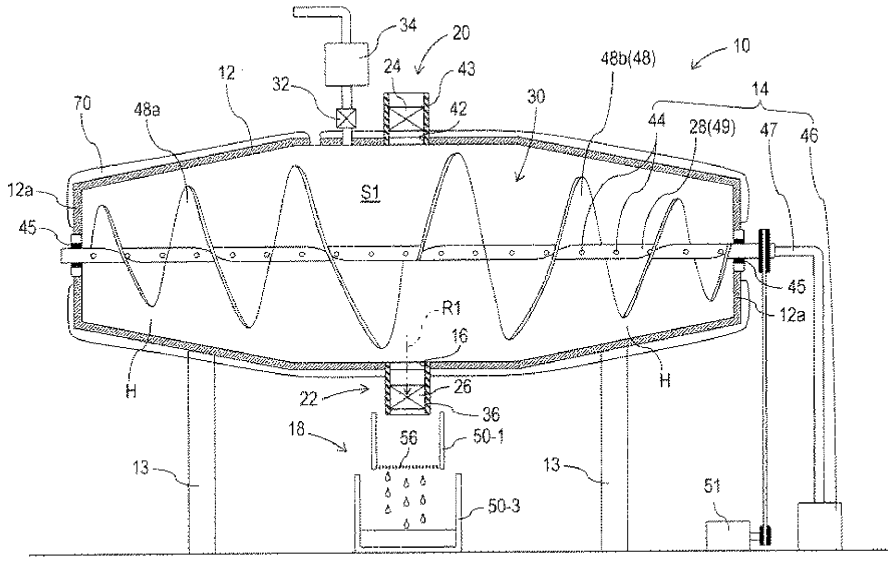
Therefore, the appeal decision contains illegality to be rescinded, and thus the Plaintiff's claim has a point. A judgment shall be made as described in the main text.

Intellectual Property High Court, First Division

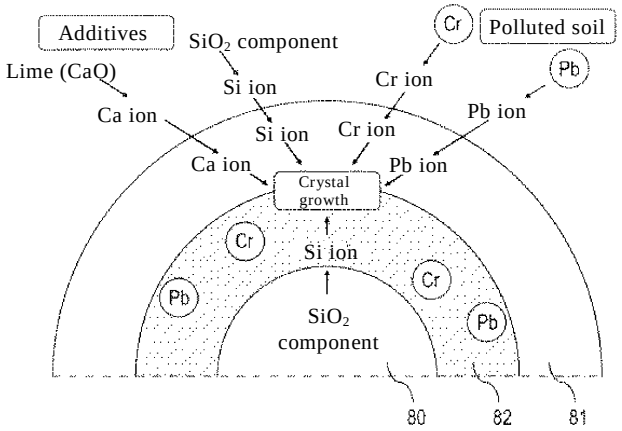
Presiding Judge TAKABE Makiko
Judge KOBAYASHI Yasuhiko
Judge SEKINE Sumiko

Attachment: List of Drawings of the Description

[Figure 1]

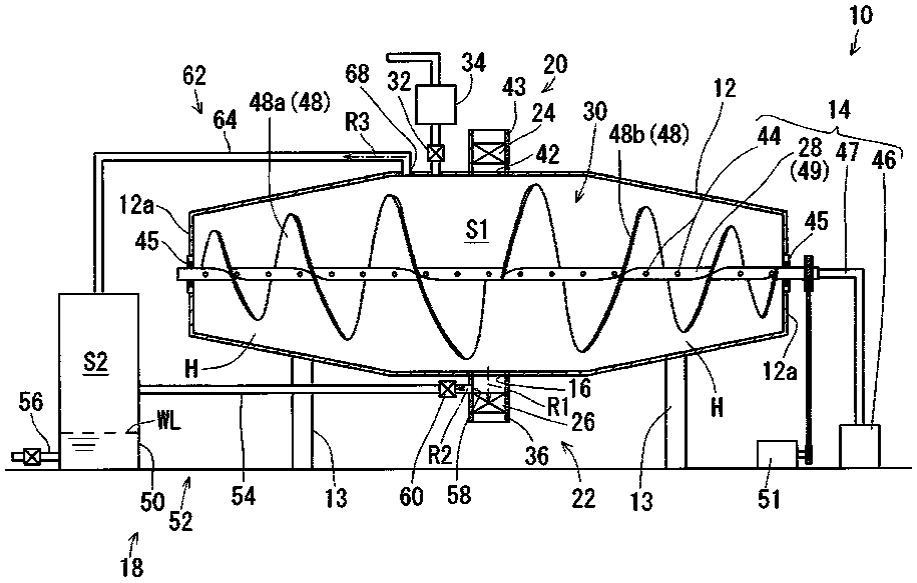


[Figure 5]



Attachment: List of Drawings of Cited Reference 1

[Figure 1]



Attachment: List of Drawings of Exhibit Ko 8

[Figure 1]