Patent Right	Date	November 13, 2019	Court	Intellectual Property High Court, First Division
	Case number	2018 (Gyo-Ke) 10149		
- A case in which the Exhibit Ko 1 document specified to be the primary cited reference in the JPO decision was described as "Cited Document 2" in the notice of grounds for rejection and the rejection decision, which lacks the description on finding of the Cited Invention and the common features and different features between the Cited Invention and the invention of the present application, and the description appears to be a sub cited reference and can incur misunderstanding and the form of the description is not appropriate, but since it can be understood that the grounds for rejection were notified on the ground of lack of inventive step with the document as the primary cited reference, and the refusal was decided, the proceedings cannot be considered to be illegal. - A case in which the amended invention has no inventive step, since finding of Exhibit Ko 1 invention and Exhibit Ko 2 art has no substantial error, both are in common in the technical field, problem to be solved, and actions, there is motivation to apply the Exhibit Ko 2 art to the Exhibit Ko 1 invention, and there is no factor teaching away from the application.				

Case type: Rescission of Appeal Decision of Refusal

Result: Dismissed

References: Article 17-2, paragraph (6), Article 126, paragraph (7), Article 159, paragraph (1), Article 53, paragraph (1), Article 29, paragraph (2) of the Patent Act

Number of related rights, etc.: Patent Application No. 2014-556707, Appeal against Examiner's Decision of Refusal No. 2017-14219

Summary of the Judgment

1. This case is an appeal against the JPO decision dismissing the request for appeal against the examiner's decision of refusal to the invention titled "PISTON WITH IMPROVED COOLING CAVITY".

   The present JPO decision decided that the present amended invention could have been easily made with the Exhibit Ko 1 document as the primary cited reference. Plaintiff alleged irregularities and the decision error on inventive step as the grounds for rescission.

2. The judgment was rendered substantially as follows and dismissed the Plaintiff's claim.

(1) Irregularities

Both in the notice of grounds for rejection and the rejection decision, the Exhibit Ko 12 document and the Exhibit Ko 1 document were described side by side as

"Cited Documents 1, 2", and the Exhibit Ko 1 document is described as "Cited Document 2", and in relation with the inventive step, there is no description on finding of the Exhibit Ko 1 invention and the common features and different features between the Exhibit Ko 1 invention and the invention of the present application and thus, the description can apparently incur misunderstanding that the Exhibit Ko 1 document is the sub cited reference.

However, it can be understood that the notice of grounds for rejection noticed the grounds for rejection of lack of novelty and lack of inventive step on the premise that a technical matter similar to the Exhibit Ko 12 document is described in the Exhibit Ko 1 document, and since the invention of the present application is an invention identical to the invention described in the Exhibit Ko 12 document and the Exhibit Ko 1 document, respectively, it lacks novelty and also lacks inventive step for reasons similar to the lack of novelty from the invention described in the Exhibit Ko 12 document and the Exhibit Ko 1 document. The present rejection decision decides that the invention of the present application lacks novelty from the invention described in the Exhibit Ko 12 document and the Exhibit Ko 1 document, respectively, and it can be understood that the rejection decision was made on the ground of the lack of inventive step based on the invention described in the Exhibit Ko 12 document and the Exhibit Ko 1 document.

Plaintiff describes in the written opinion to the present notice of grounds for rejection and the request for appeal that a person ordinarily skilled in the art could not have easily made the invention of the present application from the described matter in the Exhibit Ko 12 document and the Exhibit Ko 1 document, and it can be understood that the response was made on the premise that each of the Exhibit Ko 12 document and the Exhibit Ko 1 document can be the primary cited reference for the lack of inventive step.

According to the above, in the present notice of grounds for rejection and the present rejection decision, the notice of the grounds for rejection was made on the ground of the lack of inventive step with the Exhibit Ko 1 document as the primary cited reference in addition to the lack of inventive step with the Exhibit Ko 12 document as the primary cited reference, and the rejection decision was made since such grounds for rejection have not been solved.

Then, in the proceedings of the present notice of grounds for rejection and the present rejection decision, the form of the description is not appropriate, however, the grounds for rejection of the lack of inventive step with the Exhibit Ko 1 document as the primary cited reference was noticed, and thus it cannot be

considered that the present procedures were illegal.

(2) Error in judgment on inventive step based on the Exhibit Ko 1 invention

A. Finding of the Exhibit Ko 1 invention

The Exhibit Ko 1 document does not explicitly indicate that the groove provided on the outer periphery of the upper part is a ring groove. However, disposition of a piston ring in the ring groove provided on the outer periphery of the upper part of the piston is a common general technical knowledge, and since the Exhibit Ko 1 document also has the description on the premise that the piston 1 includes the "piston ring" and the "ring groove", a person ordinarily skilled in the art can understand that the two ring-shaped grooves provided on the upper part of the piston are the "ring grooves" and that the "piston ring" is disposed in the "ring groove", and it is found that the Exhibit Ko 1 document substantially describes the Exhibit Ko 1 invention as found in the present JPO decision.

B. Judgment on Different Feature 1

The Exhibit Ko 2 document does not explicitly indicate the matter that "configured such that a gap between the dented portion and the cavity 7 is thin". However, a person ordinarily skilled in the art can understand as a matter of common general technical knowledge that the heat on the combustion surface on the upper part can be made to escape to the cooling medium by thermal conduction by providing the combustion bowl and installing the top part and the sealed cooling cavity in proximity to each other so as to form the region between the combustion bowl and the sealed cooling cavity thin and thus, it is understood that "the region where the material of the piston body is thin is formed" in the present amended invention is to form a region where the material of the piston body is thin between the combustion bowl and the sealed cooling cavity caused by including the dented combustion bowl in order to improve cooling performance of the upper part combustion surface. In the Exhibit Ko 2 art, the region is formed between the "dented portion" on the head part of the piston 1 and the cavity 7 caused by the "dented portion", and since the Exhibit Ko 2 art is to lower the heat on the piston top surface by causing it to flow to below the piston and on the basis of the aforementioned general technical knowledge, it is obvious that such region is formed thin and thus, that "configured such that a gap between the dented portion and the cavity 7 is thin" is substantially described.

The Exhibit Ko 1 invention and the Exhibit Ko 2 art are in common in the

technical field, problem to be solved, and actions, there is motivation to apply the Exhibit Ko 2 art to the Exhibit Ko 1 invention, and there is no factor teaching away from the application and thus, Different Feature 1 could have been easily conceived of by a person ordinarily skilled in the art from the Exhibit Ko 1 invention and the Exhibit Ko 2 art.

Judgment rendered on November 13, 2019
2018 (Gyo-Ke) 10149 A case of seeking rescission of the JPO decision
Date of conclusion of oral argument: September 4, 2019

Judgment

Plaintiff: Tenneco Incorporated (indication on the JPO Decision: Federal-Mogul Limited Liability Company)

Defendant: Commissioner of the Japan Patent Office

Main text

1. The Plaintiff's claim shall be dismissed.
2. Plaintiff shall bear the court costs.
3. The additional period for filing a final appeal and a petition for acceptance of final appeal against this judgment for Plaintiff shall be 30 days.

Facts and reasons

No. 1 Claim

The JPO decision for Appeal against Examiner's Decision No. 2017-14219 made on June 11, 2018 shall be rescinded.

No. 2 Outline of the case

1. Outline of procedures at the JPO, etc.

(1) Federal-Mogul Corporation (changed the name to "Federal-Mogul Limited Liability Company" on March 24, 2017 and merged with Plaintiff on October 1, 2018, hereinafter, called "Plaintiff" throughout the period extending before and after the merger) filed a patent application for an invention titled "PISTON WITH IMPROVED COOLING CAVITY" (Patent Application No. 2014-556707, Exhibit Ko 3, number of claims: 6, priority date: February 10, 2012, priority country: United States.) on February 8, 2013. Since Plaintiff received the notice of grounds for rejection as of January 27, 2017 (Exhibit Ko 4, hereinafter referred to as the "present notice of grounds for rejection" and the written notice as the "present written notice of grounds for rejection"), Plaintiff amended the scope of claims by the written amendment as of April 21 of the same year (Exhibit Ko 6,

hereinafter, referred to as the "amendment as of April 21", number of claims: 5).

In response to Plaintiff receiving the rejection decision as of May 25, 2017 (Exhibit Ko 7, hereinafter referred to as the "present rejection decision", and the written rejection decision as the "present written rejection decision"), Plaintiff requested an appeal against the decision on September 26 of the same year(Exhibit Ko 8) and submitted a written amendment as of the same date (Exhibit Ko 9, hereinafter, referred to as the "present amendment", number of claims: 5).

(2) The Japan Patent Office examined this as the Appeal against Examiner's Decision No. 2017-14219, dismissed the present amendment on June 11, 2018, made the JPO decision (hereinafter, referred to as the "present JPO decision") described in the written JPO decision (copy) in the amendment that "the request for the present appeal is dismissed", and the certified copy thereof was served to Plaintiff on the 26th day of the same month. As the limitation of action, 90 days were added.

(3) Plaintiff instituted the present lawsuit claiming rescission of the present JPO decision on October 23, 2018.

2. Description of scope of claims

(1) Scope of claims before the present amendment

In the scope of claims before the present amendment (after the amendment by the amendment as of April 21), the description in Claim 1 which is subject to judgment in the present JPO decision is as follows. Hereinafter, this invention is referred to as the "present application invention" and the Description thereof (Exhibit Ko 3) including the drawings is referred to as the "present application Description". The symbol "/" in the sentences indicates a line break in the original sentences (the same applies to the following).

[Claim 1] A piston for an internal combustion engine /
including a body having a cylindrical outer surface and having an annular uppermost ring groove and a lower ring groove extending in the outer surface, a top land extending from the uppermost ring groove to an upper-part combustion surface, and the body having a pair of pin bosses having pin bores aligned with each other along a pin bore shaft, the piston further including /
a first piston ring arranged in the uppermost ring groove and /
a second piston ring arranged in the lower ring groove, wherein /
the body has an annular sealed cooling cavity, in which a cooling medium is arranged,

the sealed cooling cavity being configured by being aligned in a radial direction between the first piston ring and the second piston ring, the sealed cooing cavity having an uppermost surface and a lowermost surface, the uppermost surface being aligned substantially in the radial direction with the uppermost ring groove, and the lowermost surface extending below the lower ring groove.

(2) Scope of claims after the amendment by the present amendment

The description in Claim 1 of the scope of claims after the amendment by the present amendment is as follows (the amended portions are underlined). Hereinafter, this invention is referred to as the "present amended invention".

[Claim 1] A piston for an internal combustion engine /
including a body having a cylindrical outer surface and having an annular uppermost ring groove and a lower ring groove extending in the outer surface, a top land extending from the uppermost ring groove to an upper-part combustion surface, and the body having a pair of pin bosses having pin bores aligned with each other along a pin bore shaft, the piston further /
including a first piston ring arranged in the uppermost ring groove, /
a second piston ring arranged in the lower ring groove, and /
a dented combustion bowl suspended from a flat uppermost portion of an upper-part combustion surface, wherein/
the body has an annular sealed cooling cavity, in which a cooling medium is arranged, the sealed cooling cavity being configured by being aligned in a radial direction between the first piston ring and the second piston ring, the sealed cooling cavity being configured so as to form a thin material region in a piston body between the combustion bowl and the sealed cooling cavity, the sealed cooling cavity having an uppermost surface and a lowermost surface, the uppermost surface being aligned substantially in the radial direction with the uppermost ring groove, and the lowermost surface extending below the lower ring groove.

3. Gist of the reasons given in the JPO decision

(1) The reasons given in the JPO decision are as described in the written JPO decision (copy) in the attachment. In summary, [i] the present amended invention could have been easily made by a person ordinarily skilled in the art on the basis of the invention described in Exhibit Ko 1 in the following A (hereinafter, referred to as the "Exhibit Ko 1 invention") and the technical

matter described in Exhibit Ko 2 in the following B (hereinafter, referred to as the "Exhibit Ko 2 art") and could not be granted a patent independently at the filing of a patent application pursuant to the provisions in Article 126, paragraph (7) of the Patent Act which is applied mutatis mutandis pursuant to Article 17-2, paragraph (6) of the Act and thus, the amendment should be dismissed pursuant to the provisions in Article 53, paragraph (1) of the Act which is applied mutatis mutandis pursuant to Article 159, paragraph (1) of the Act; and [ii] similarly to the present amended invention, the present application invention cannot be granted a patent pursuant to the provisions in Article 29, paragraph (2) of the Act.

A. Unexamined Patent Application Publication No. 1992-265451 (Exhibit Ko 1, hereinafter referred to as the "Exhibit Ko 1 document").

B. Microfilm photographing contents of Description and drawings first attached to Utility Model Application No. 1982-177789 (Unexamined Utility Model Application Publication No. 1984-81758) (Exhibit Ko 2, hereinafter referred to as the "Exhibit Ko 2 document").

(2) The Exhibit Ko 1 invention found in the present JPO decision and Common Features and Different Features between the present amended invention and the Exhibit Ko 1 invention are as follows.

A. Exhibit Ko 1 invention

A piston 1 of a two-cycle engine /

including a piston body having a cylindrical upper outer periphery 2, having a ring groove on a side closer to an annular top surface 7 extending in the upper outer periphery 2 and a ring groove on a side farther from the top surface 7, a top land extending from the ring groove on the side closer to the top surface 7 to the top surface 7, and the body having a pair of pin bosses having pin bores aligned with each other along a pin bore shaft, the piston further /

including /

a piston ring arranged in the ring groove on the side closer to the top surface 7 and /

a piston ring arranged in the ring groove on the side farther from the top surface 7, /

the body having a cavity portion 3 closed by a plug 6 into which sodium is poured, the cavity portion 3 closed by the plug 6 is configured by being

aligned in a radial direction with the piston ring arranged in the ring groove on the side closer to the top surface 7 and the piston ring arranged in the ring groove on the side farther from the top surface 7, and the cavity portion 3 closed by the plug 6 having an uppermost surface and a lowermost surface.

B. Common Features between the present amended invention and the Exhibit Ko 1 invention

A piston for an internal combustion engine /

including a body having a cylindrical outer surface and having an annular uppermost ring groove and a lower ring groove extending in the outer surface, a top land extending from the uppermost ring groove to an upper-part combustion surface, and the body having a pair of pin bosses having pin bores aligned with each other along a pin bore shaft, the piston further /

including /

a first piston ring arranged in the uppermost ring groove and /

a second piston ring arranged in the lower ring groove, /

the body having a sealed cooling cavity, in which a cooling medium is arranged, the sealed cooling cavity being configured by being aligned in a radial direction with the first piston ring and the second piston ring, and the sealed cooing cavity having an uppermost surface and a lowermost surface.

C. Different Features between the present amended invention and the Exhibit Ko 1 invention

(Different Feature 1)

The present amended invention includes "a dented combustion bowl suspended from a flat uppermost portion of an upper-part combustion surface" and "the sealed cooling cavity is configured so as to form a thin material region in a piston body between the combustion bowl and the sealed cooling cavity", while the Exhibit Ko 1 invention does not include such configuration.

(Different Feature 2)

With regard to the "sealed cooling cavity", the present amended invention has an "annular" sealed cooling cavity, while whether it is annular or not is not clear in the Exhibit Ko 1 invention

(Different Feature 3)

With regard to the "sealed cooling cavity", in the present amended invention, it is configured "between" the first piston ring and the second piston ring, and with the

"uppermost surface being aligned substantially in the radial direction with the uppermost ring groove, and the lowermost surface extending below the lower ring groove", while whether the Exhibit Ko 1 invention includes such configuration is not clear.

(3) The Exhibit Ko 2 art found in the present JPO decision is as follows.

A piston 1 for an internal combustion engine, /

including a piston head portion, /

including a dented portion suspended from a flat uppermost portion of the upper-part combustion surface, /

the piston head portion having a cavity 7, in which metal M with good conductivity is sealed, the cavity 7 being configured so as to be thin between the dented portion and the cavity 7.

4. Reasons for rescission

(1) Irregularities (Reason 1 for rescission)

(2) Error in judgment on inventive step based on the Exhibit Ko 1 invention (Reason 2 for rescission)

(omitted)

No. 4 Judgment of the court

1. Present amended invention

(1) The present application Description has the following description on the present amended invention (for the drawings cited in the following description, see the list of drawings of the present application Description in the attachment).

A. Technical Field

[0001] Background of the Invention /

1. Technical Field /

The present invention generally relates to an internal combustion engine and more specifically to a piston for an internal combustion engine.

B. Background Art

[0002] 2. Related Art /

Engine manufacturers are faced with a demand for improvement in engine

efficiency and performances including, but not limited to, improvement of fuel consumption, improvement of fuel combustion, reduction of oil consumption, higher temperature of an exhaust gas for continuous use of heat in a vehicle, increase of a compression load in a cylinder bore, weight reduction, and size reduction of an engine. Therefore, the temperature and the compression load are preferably raised in an engine combustion chamber. However, by raising the temperature and compression load in the combustion chamber, wear and physical loads to the piston increase, whereby its latent service life is shortened. Effects of particular concern include excessive heat generation in the upper-part combustion surface region and a piston ring region of the piston, and accompanying wear.

C. Means for Solving the Problem

[0003] The piston configured in accordance with the present invention can favorably withstand the excessive heat generated in modern high-performance engines, as will be made apparent to the persons ordinarily skilled in the art by reading this disclosure and by referring to the attached drawings.

[0004] Summary of the Invention /

A piston for an internal combustion engine is provided. The piston includes a body having a cylindrical outer surface, and has an annular uppermost ring groove and a lower ring groove extending in the outer surface. A top land extends from the uppermost ring groove to an upper-part combustion surface. The body has a pair of pin bosses having pin bores aligned with each other along a pin bore shaft. A first piston ring is arranged in the uppermost ring groove, and a second piston ring is arranged in the lower ring groove. The body has an annular sealed cooling cavity, in which a cooling medium is accommodated. The sealed cooling cavity is configured by being aligned substantially in a radial direction between the first piston ring and the second piston ring. As a result, a sealed cooling chamber is configured so as to optimize a cooling effect for an upper-part combustion surface and a ring belt region by the cooling medium accommodated therein. Thus, the service life of the piston can be improved.

D. Best Mode for Carrying Out the Invention

[0007] Detailed Description of Presently Preferred Embodiment /

Referring to the drawings in more detail, Figures 1 and 2 illustrate sectional views of a piston 10 configured in accordance with a presently preferred aspect of the present invention which is reciprocally moved in a cylinder bore of an internal

combustion engine such as a compact and high-performance modern vehicle engine, for example. The piston 10 has a body 12. The body 12 is made of a single integral casting material or the like or is formed of a forging material or a billet material, but these are examples and are not limiting. The body 12 extends along a longitudinal axis 13 at a center, and the piston 10 is reciprocally moved in the cylinder bore along the longitudinal axis 13 at the center. The body 12 has an upper-part combustion wall 14. This upper-part combustion wall 14 has an upper-part combustion surface 16 on one side thereof, configured to be directly exposed to a combustion gas in the cylinder bore, and a lower crown surface 18 on a side opposite to that, located below in an axial direction of a part of the upper-part combustion surface 16. The piston body 12 also includes a substantially cylindrical outer wall 20. This cylindrical outer wall 20 has a cylindrical outer surface 21 suspended from the upper-part combustion surface 16 over a ring belt region 22 directly adjacent to this upper-part combustion surface 16. The ring belt region 22 includes an uppermost ring groove 23 and a lower ring groove illustrated as a lowermost ring groove 24. The ring grooves 23 and 24 are configured to receive first and second piston rings 26 and 27, respectively. Moreover, the piston body 12 is formed so as to have a closed cooling cavity 28 arranging and accommodating a cooling medium 30 therein. The cooling cavity 28 is configured on an inner side in the radial direction and is aligned substantially in the radial direction with the ring belt region 22. The cooling cavity 28 is configured in accordance with the present invention and improves transmission of heat from the upper-part combustion surface 16 and the ring belt region 22 to a cylinder liner and an engine block. Thus, the heat generated in the upper-part combustion wall 14 and the ring belt region 22 is finally transmitted to the cylinder liner and the engine block, thereby promoting lowering an operation temperature of the piston 10 and improving the service life of the piston 10.

[0008] The cooling medium 30 can be provided exclusively as a metal coolant which becomes a liquid at the operation temperature of the piston 10. By considering a desired heat transfer coefficient, any suitable lightweight metal material may be used. Moreover, the cooling medium 30 can be provided as liquid metal mixed with powder metal such as copper or aluminum. Particularly if it is desirable to improve heat transfer characteristics of the cooling medium 30, the metal powder can be added. Furthermore, a heat transfer liquid as typically used for heat exchange for industrial use can be used.

[0009] As best shown in Figure 2, most preferably the piston 12 has a pair of pin bosses 32. These pair of pin bosses 32 are suspended from the lower crown surface

18 and form pin bores 34 arranged at intervals in a lateral direction. These pin bores 34 are aligned coaxially along a pin bore shaft 36 extending so as to generally cross the longitudinal axis 13 at the center. These pin bosses 32 are bonded to skirt portions 38 arranged at an interval in the lateral direction. These skirt portions 38 are arranged on both sides of the pin bore shaft 36 at an interval from each other in a diameter direction and have a projecting outer surface 40 having a profile for allowing the piston 10 to perform a sliding motion in the cylinder bores so as to be easily maintained in a desired direction thereof.

[0010] The upper-part combustion surface 16 is illustrated by having a dented combustion bowl 42. This combustion bowl 42 is suspended from a flat uppermost portion of the upper-part combustion surface 16 to a lowermost annular valley portion 43 extending around a raised center top portion 45 and gives a desired gas flow in the cylinder bore. At least a part of a region in the piston body with a relatively thin material caused by the combustion bowl 42 is formed among the combustion bowl 42, the cooling cavity 28, and the lower crown surface 18.

[0014] The cooling cavity 28 extends between the ring grooves 23 and 24, thereby facilitating cooling of the entire ring belt region 22, the valley portion region 43 of the combustion bowl 42, and the uppermost flat region of the upper-part combustion surface 16. Particularly, the cooling cavity 28 extends upward toward the uppermost top potion or a surface 52 and extends downward toward the lowermost valley portion or a surface 54. The uppermost surface 52 is illustrated by being aligned in the radial direction with the flat lowermost surface 55 of the uppermost ring groove 23, and the lowermost surface 54 is illustrated by being aligned in the radial direction with the uppermost flat surface 56 of the lower ring groove 24.

[0015] Figure 3 illustrates a sectional view of a piston 110 configured in accordance with a presently preferred aspect of the present invention, and the same reference numerals as those above with 100 added are used in order to discriminate features similar to the above. The piston 110 has a body 112, an upper-part combustion wall 114 having an upper-part combustion surface 116, and a lower crown surface 118 as described above. The piston body 112 also includes a substantially cylindrical outer wall 120 suspended from the upper-part combustion surface 116 over a ring belt region 122 and having a cylindrical outer surface 121. The ring belt region 122 includes an uppermost ring groove 123 and a lower ring groove indicated as a lowermost ring groove 124. The ring grooves 123 and 124 are configured to receive first and second piston rings 126 and 127, respectively. Moreover, the piston body 12 has a closed cooling cavity 128, and a cooling medium 130 is arranged and

accommodated in the cooling cavity 128. The cooling cavity 128 is configured by being aligned substantially in the radial direction with the ring belt region 122.

[0016] The uppermost ring groove 123 is configured as above, but the lowermost ring groove 123 is moved upward in an axial direction, and a relatively thin annular flange 60 of the piston body material having a thickness which is substantially the thickness of the second piston ring 127 is formed between the ring grooves 123 and 124. As a result, the ring belt region 122 has a decreased axial length as compared with the ring belt region 22.

[0017] Moreover, in contrast to the piston 10, a combustion bowl 142 has a fully dented surface and thus, it does not have a central top portion. Moreover, as with the first embodiment, the cooling cavity 128 extends upward toward the uppermost top portion or a surface 152 and extends downward toward a lowermost surface 154. The uppermost surface 152 is illustrated by being aligned in the radial direction with a flat lowermost surface 155 of the uppermost ring groove 123. However, in contrast to the first embodiment, the lowermost surface 154 is illustrated as extending below a lowermost flat surface 62 of the lower ring groove 124. Thus, the cooling cavity 128 extends over the entire width in the axial direction of the lowermost ring groove 124.

(2) According to the aforementioned (1), the features of the present amended invention are as follows.

A. Technical field

The present amended invention generally relates to an internal combustion engine and more specifically to a piston for an internal combustion engine ([0001]).

B. Related Art (Problems to be Solved by the Invention)

Engine manufacturers are faced with a demand for improvement in engine efficiency and performances including, but not limited to, improvement of fuel consumption, improvement of fuel combustion, reduction of oil consumption, higher temperature of exhaust for continuous use of heat in a vehicle, increase of a compression load in a cylinder bore, weight reduction, and size reduction of an engine. Therefore, the temperature and the compression load are preferably raised in an engine combustion chamber. However, by raising the temperature and compression load in the combustion chamber, wear and physical loads to the piston increase, thereby shortening its latent service life. Effects of particular concern include excessive heat generation in the upper-part combustion surface region and a piston ring region of the piston and accompanying wear.

The piston configured in accordance with the present amended invention and the

present application invention can favorably withstand the excessive heat generated in modern high-performance engines, as will be made apparent to persons ordinarily skilled in the art by reading this disclosure and by referring to the attached drawings ([0002], [0003]).

C. Summary of the Invention (Means for Solving the Problems)

A piston for an internal combustion engine is provided. The piston includes a body having a cylindrical outer surface and has an annular uppermost ring groove and a lower ring groove extending in the outer surface. A top land extends from the uppermost ring groove to an upper-part combustion surface. The body has a pair of pin bosses having pin bores aligned with each other along a pin bore shaft. A first piston ring is arranged in the uppermost ring groove, and a second piston ring is arranged in the lower ring groove. The body has an annular sealed cooling cavity, in which a cooling medium is accommodated. The sealed cooling cavity is configured by being aligned substantially in a radial direction between the first piston ring and the second piston ring. As a result, a sealed cooling chamber is configured so as to optimize a cooling effect for an upper-part combustion surface and a ring belt region by the cooling medium accommodated therein. Thus, the service life of the piston can be improved ([0004]).

D. Detailed Description of the Presently Preferred Embodiment (Mode for Carrying Out the Invention)

Figure 3 illustrates a sectional view of a piston 110 configured in accordance with presently preferred aspects of the present amended invention and the present application invention. The piston 110 has a body 112, an upper-part combustion wall 114 having an upper-part combustion surface 116, and a lower crown surface 118. The piston body 112 includes a substantially cylindrical outer wall 120 suspended from the upper-part combustion surface 116 over a ring belt region 122 and having a cylindrical outer surface 121. The ring belt region 122 includes an uppermost ring groove 123 and a lower ring groove indicated as a lowermost ring groove 124. The ring grooves 123 and 124 are configured to receive first and second piston rings 126 and 127, respectively. Moreover, the piston body 12 has a closed cooling cavity 128, and a cooling medium 130 is arranged and accommodated in the cooling cavity 128. The cooling cavity 128 is configured by being aligned substantially in the radial direction with the ring belt region 122.

The uppermost ring groove 123 is configured as above, but the lowermost ring

groove 124 is moved upward in an axial direction, and a relatively thin annular flange 60 of the piston body material having a thickness which is substantially the thickness of the second piston ring 127 is formed between the ring grooves 123 and 124. As a result, the ring belt region 122 has a decreased axial length as compared with the ring belt region 22.

In contrast to the piston 10, a combustion bowl 142 has a fully dented surface and thus, it does not have a central top portion. As with the first embodiment, the cooling cavity 128 extends upward toward the uppermost top portion or surface 152 and extends downward toward a lowermost surface 154. The uppermost surface 152 is illustrated by being aligned in the radial direction with a flat lowermost surface 155 of the uppermost ring groove 123. However, in contrast to the first embodiment, the lowermost surface 154 is illustrated as extending below a lowermost flat surface 62 of the lower ring groove 124. Thus, the cooling cavity 128 extends over the entire width in the axial direction of the lowermost ring groove 124 ([0015] to [0017]).

2. Reason 1 for rescission (irregularities)

(1) History of procedures

A. Present notice of grounds for rejection and the rejection decision

(A) Plaintiff received the notice of grounds for rejection by the present written notice of grounds for rejection (Exhibit Ko 4) as of January 27, 2017.

The present written notice of grounds for rejection has the following description.

"[Ground 1]

Claims: 1, 4 to 6

Cited Documents: 1, 2

Remarks

Cited Document 1 describes a piston in which an annular uppermost ring groove and a lower ring groove extending in an outer surface are provided, a top land extends from the uppermost ring groove to an upper-part combustion surface, a body has a pair of pin bosses having pin bores aligned with each other along a pin bore shaft, the piston further includes a first piston ring arranged in the uppermost ring groove and a second piston ring arranged in the lower ring groove, the body has an annular sealed cooling cavity (6), the cooling medium is arranged therein, and the sealed cooling cavity is configured by being aligned in a radial direction between the first piston ring and the second piston ring. Moreover, Cited Document 1 also describes that the sealed cooling cavity has an uppermost surface and a lowermost surface, the

uppermost surface is aligned substantially in the radial direction with the uppermost ring groove, the lowermost surfaced is aligned substantially in the radial direction with the lower ring groove, the sealed cooling cavity has an uppermost surface and a lowermost surface, the uppermost surface is aligned substantially in the radial direction with the uppermost ring groove, the lowermost surface extends below the lower ring groove, and the lower ring groove is the lowermost ring groove (Figure 1).

Cited Document 2 has a similar description (Figure 3).

Then, there is no difference between the invention according to Claims 1 and 4 to 6 of the present application and the inventions described in Cited Documents 1 and 2."

"[Ground 2]

Claims: 1, 4 to 6

Cited Documents: 1, 2

Remarks

The invention according to Claims 1 and 4 to 6 in the present application could have been easily made by a person ordinarily skilled in the art from the inventions described in Cited Documents 1 and 2 (see 'Ground 1')."

"<List of cited documents and the like>

1. Unexamined Patent Application Publication No. 1977-092034 (note by the court: Exhibit Ko 12)
2. Unexamined Patent Application Publication No. 1992-265451 (note by the court: Exhibit Ko 1)"

(B) Plaintiff amended the scope of claims by a written amendment (Exhibit Ko 6) as of April 21, 2017 (amendment as of April 21) and submitted a written opinion as of the same date (Exhibit Ko 5, hereinafter, referred to as the "present written opinion.").

The present written opinion has the following description.

"(3) Grounds for rejection under Article 29 of the Patent Act

The examiner pointed out that the invention described in Claim 1 before amendment of the present application is identical to the inventions described in the Cited Documents 1 and 2. ... The invention described in the Cited Document 2 has a cavity portion 3 but its range is only defined as 'an inner side of at least an upper-part outer periphery portion in the upper-part outer peripheral portion and from the upper part outer periphery to a top surface of the piston' and does not disclose any

configuration specifying the range of the cavity portion.

The present application invention after the amendment defines the range of the cooling cavity for an upper end thereof as a position aligned in the radial direction with the uppermost ring groove and a lower end thereof such that it may be extended further downward from the lower ring groove (Claim 1 after the amendment), thereby promoting cooling in the entire ring belt region 22 defined as a region between the uppermost ring groove and the lower ring groove, the valley portion region of the combustion bowl 42, and the uppermost flat region of an upper-part edge front 16 (paragraph [0014] in Description). Such cooling cavity of the present application invention is different from the cooling cavity (6) of Cited Document 1 in a point that it does not reach a position reaching a ceiling of the piston but is limited to a position aligned in the radial direction with the uppermost ring groove. Moreover, it is also different from the cavity portion 3 disclosed in Cited Document 2 which does not specify an existing range of the cavity portion.

As described above, the cooling cavity in the present application invention after the amendment has the ring belt region defined by using the ring groove, and the suitable range for promoting cooling of the piston is defined is not disclosed in Cited Document 1 or 2. Therefore, the present application invention according to Claim 1 and the dependent claim after the amendment is considered to have novelty and an inventive step over the inventions described in the Cited Documents.

... as described as above, since all the grounds for rejection of the present application invention after the amendment are considered to have been solved, we ask you to conduct another examination and give a decision of granting a patent."

(C) Plaintiff received the rejection decision by the present written rejection decision (Exhibit Ko 7) as of May 25, 2017.

The present written rejection decision has the following description.

"This application should be rejected for ground 2 described in the notice of grounds for rejection as of January 27, 2017."

"Ground 2 (Article 29, paragraph (2) of the Patent Act)

Claim: 1

Cited Documents: 1, 2

... however, the fact that the piston upper surface is overheated easily and should be cooled is a well-known problem as described in paragraph [0004] and the like in Cited Document 2, and it is described in Figure 1 and the like of Cited Document 2 that a cooling cavity is provided only in the vicinity of the ring groove on the piston upper surface. Thus, to set a position of the cooling cavity on the basis of the

problem that the piston top surface is overheated easily could have been easily conceived by a person ordinarily skilled in the art.

Therefore, the invention according to Claim 1 of the present application could have been easily made by a person ordinarily skilled in the art from the inventions described in Cited Documents 1 and 2."

B. The appeal

(A) Plaintiff submitted a request for appeal (Exhibit Ko 8) as of September 26, 2017 and also submitted a written amendment (Exhibit Ko 9) and amended Claim 1 in the scope of claims (present amendment).

The request for appeal has the following description.

"[Main points of rejection decision]

The ground for rejection in the original decision was that the inventions according to Claims 1 to 5 cannot be granted a patent under the provisions of Article 29, paragraph (2) of the Patent Act.

The ground for that is that, in brief, the present application invention could have been easily made by a person ordinarily skilled in the art from the inventions described in the Cited Documents. ...

(3) Description of the Cited Inventions

Cited Document 1 discloses a piston for an engine having a machine bore 6, but its uppermost part does not have a special feature.

Cited document 2 discloses a piston for a two-cycle engine having a cavity portion 2, but its uppermost part does not have a special feature. ...

(4) Comparison between the present application invention and the Cited Inventions

The present application invention according to Claim 1 after the amendment includes a 'combustion bowl' suspended from an uppermost part of the combustion surface. The inventions in the Cited Documents 1 to 4 have no special feature in the uppermost part and do not disclose the configuration corresponding to this combustion bowl. Thus, to conceive of the invention according to Claim 1 after the amendment is impossible, however the Cited Documents are combined.

In the present application invention after the amendment, the thin material region is formed in the piston body between the combustion bowl and the sealed cooling cavity, since the present application invention is intended to cool not only the ring

belt region but also the upper-part combustion surface (paragraphs [0004], [0014] in Description) and has an object to obtain the effect. Such configuration or technical idea is not disclosed, either, in any of the Cited Documents, and it is impossible to conceive of the invention described in Claim 1 after the amendment from Cited Documents 1 to 4.

[Conclusion]

Therefore, the present application invention could not have been made easily by a person ordinarily skilled in the art from the inventions described in Cited Documents 1 to 4. ..."

(B) The panel of this appeal found that the present amendment is applicable to that which is done for the purpose of restriction of the scope of claims under Article 17-2, paragraph (5), item (ii) of the Patent Act and examined the independent patentability requirement on June 11, 2018. At that time, the panel pointed out Different Features 1 to 3 as above with the Exhibit Ko 1 invention as the Cited Invention 1 and decided that Different Feature 1 could have been easily conceived of by citing the described matter in the Exhibit Ko 2 document as the Exhibit Ko 2 art in addition to the Exhibit Ko 1 invention, while with regard to the remaining Different Features, the panel decided that they could have been easily conceived of only on the basis of the Exhibit Ko 1 invention, and dismissed the amendment. Moreover, the panel decided that the present application invention could also have been easily conceived of for substantially the same grounds.

(2) Examination

A. According to the above, both in the present written notice of grounds for rejection and the rejection decision, the Exhibit Ko 12 document and the Exhibit Ko 1 document were described side by side as "Cited Documents 1, 2", and the Exhibit Ko 1 document is described as "Cited Document 2", and in relation with the inventive step, there is no description on finding of the Exhibit Ko 1 invention and Common Features and Different Features between the Exhibit Ko 1 invention and the invention of the present application invention and thus, the description can apparently incur misunderstanding that the Exhibit Ko 1 document is the sub cited reference.

However, according to the aforementioned finding, it can be understood that the present written notice of grounds for rejection noticed the grounds for rejection of the lack of novelty and the lack of inventive step finding that in Ground 1, indicating specific description contents for the Exhibit Ko 12 document and indicating that

"similar description is made also in Cited Document 2 (Figure 3)" for the Exhibit Ko 1 document (Cited Document 2), on the premise that a technical matter similar to that of the Exhibit Ko 12 document is described in the Exhibit Ko 1 document, since the present application invention is an invention identical to the invention described in the Exhibit Ko 12 document and the Exhibit Ko 1 document, respectively, it lacks novelty, and in Ground 2, indicating that "(see 'Ground 1').", the present application invention also lacks inventive step for the grounds similar to the lack of novelty from the invention described in the Exhibit Ko 12 document and the Exhibit Ko 1 document, respectively.

Moreover, the present rejection decision has description that the invention should be rejected for the ground 2 described in the present written notice of grounds for rejection as a conclusion, cited both the Exhibit Ko 12 document and the Exhibit Ko 1 document, and indicated the specific description contents of the Exhibit Ko 1 document in Ground 2 and therefore, decided that the present application invention lacks the inventive step from the invention described in each of the Exhibit Ko 12 document and the Exhibit Ko 1 document. Thus, it can be understood that the rejection decision was made on the ground of the lack of inventive step based on the inventions described in the Exhibit Ko 12 document and the Exhibit Ko 1 document.

According to the above, in the present notice of grounds for rejection and the present rejection decision, the grounds for rejection were noticed on the ground of the lack of inventive step with the Exhibit Ko 1 document as the primary cited reference in addition to the lack of inventive step with the Exhibit Ko 12 document as the primary cited reference, and the rejection decision was made in view that such grounds for rejection have not been solved.

In addition, as described above, Plaintiff alleged in the written opinion to the present notice of grounds for rejection that the present application invention after the amendment as of April 21 is, in comparison not only with the described matters in the Exhibit Ko 12 document but also with the described matters in the Exhibit Ko 1 document, "also different from the cavity portion 3 disclosed in Cited Document 2 in which a specific existing range of the cavity portion is not specified" and then, stated that the cooling cavity as in the present application invention after the amendment as of April 21 in which the ring belt region is defined by using the ring groove and a suitable range for promoting cooling of the piston is defined on the basis of the region is disclosed in neither the Exhibit Ko 12 document nor the Exhibit Ko 1 document and has novelty and inventive step over the inventions described in the Exhibit Ko 12 document and the Exhibit Ko 1 document. Moreover, Plaintiff indicated not only the

described matters in the Exhibit Ko 12 document but also the described matters in the Exhibit Ko 1 document also in the request for appeal and described that a person ordinarily skilled in the art could not have easily made the present application invention from either of the cited inventions. According to them, it can be understood that Plaintiff made the response on the premise that each of the Exhibit Ko 12 document and the Exhibit Ko 1 document can be the primary cited reference for the lack of inventive step.

Then, in the procedures of the present notice of grounds for rejection and the present rejection decision, although the form of the description is not appropriate, the grounds for rejection of the lack of inventive step with the Exhibit Ko 1 document as the primary cited reference were noticed.

B. In the present JPO decision, the independent patentability requirement of the present amended invention is decided with the Exhibit Ko 1 document as the primary cited reference, and this document can be evaluated as in the aforementioned A to be the primary cited reference both in the present notice of grounds for rejection and the present rejection decision. And it is decided that Different Features 2 and 3 which are different features from the present application invention before the present amendment could have been easily conceived of for the grounds substantially similar to the present amended invention; that is, from the Exhibit Ko 1 invention.

With regard to Different Feature 1, the Exhibit Ko 2 document was newly cited, but since Different Feature 1 is the matter added by the present amendment, there is no illegality in making the decision of dismissing the amendment without adding the new sub cited reference for this point or noticing the grounds for rejection (the proviso to Article 50 of the Patent Act).

C. Since contents of the present reconsideration report were not used for the present JPO decision, it cannot be considered that there was illegality affecting the present JPO decision with the citation of the Exhibit Ko 15 document as the new primary cited reference in the present reconsideration report.

(3) Summary

According to the above, the present procedures cannot be considered to be illegal, and the reason 1 for rescission are not grounded.

3. Reason 2 for rescission (error in judgment on inventive step based on the Exhibit Ko 1 invention)

(1) Exhibit Ko 1 invention

A. The Exhibit Ko 1 document has roughly the following description (for the drawings cited in the following description, see the list of Exhibit Ko 1 drawings in the attachment)

"(A) Scope of claims

[Claim 1] A piston of a two-cycle engine, characterized in that a cavity portion is provided on an inner side of at least an upper-part outer periphery portion in the upper-part outer periphery portion and from an upper-part outer periphery to a top surface of the piston, and sodium is sealed in the cavity portion in approximately a half of a volume of the cavity portion.

(B) Industrial Applicability

[0001] The present invention relates to a piston of a two-cycle engine with improved heat dispersion.

(C) Prior Art

[0002] The piston of the two-cycle engine has a thickness in the vicinity of a top surface B of the piston A increased as illustrated in Figure 4 so as to withstand a combustion pressure received by the top surface B and also to increase a heat capacity. Moreover, a piston for a four-cycle engine includes one with a cavity provided on an inner side of the top surface so as to allow a lubricant oil to flow in and to promote cooling with the lubricant oil. ...

[0003] The piston of the two-cycle engine is cooled by a fuel taken into a cylinder, and the cooling is limited. Thus, it has such nonconformity that lack of cooling occurs and scuffing is generated on a sliding surface on a piston outer periphery, or ring stick occurs and the like. Moreover, if the thickness of the piston in the vicinity of the top surface is increased, piston weight increases, and it has nonconformity that inertia during a reciprocating motion of the piston becomes large.

[0004] In view of such points, the present invention has an object to obtain a piston of a two-cycle engine which can improve cooling performances by dispersing heat received in the vicinity of the top surface of the piston to a direction of a skirt on a lower side and reduce a piston weight.

(D) Means for Solving the Problem

[0005] In order to achieve the aforementioned object, the piston for a two-cycle engine of the present invention has a cavity portion provided on an inner side of at least an upper-part outer periphery portion in the upper-part outer periphery portion and from the upper-part outer periphery to a top surface of the piston, and sodium is

sealed in the cavity portion in approximately a half of a volume of the cavity portion.

(E) Operation

[0006] Since sodium sealed in the cavity has a melting point of 93°C, when the top surface of the piston receives heat of a combustion gas and a temperature rises, sodium is liquefied. Then, the sodium liquefied in the cavity is agitated, the heat received on the top surface is dispersed to the skirt direction on a lower part, and overheating of the top surface can be prevented, and an appropriate temperature can be kept. As a result, thermal imbalance of the piston itself can be solved.

(F) Examples

[0007] Hereinafter, working examples of the present invention will be described by referring to Figures 1 to 3. Figures 1 and 2 illustrate one working example of the present invention. A cavity portion 3 is provided on an inner side of an upper-part outer periphery 2 of a piston 1 in a two-cycle engine. Then, sodium 4 in an amount approximately half of a capacity of the cavity portion 3 is poured into the cavity portion 3. The sodium 4 is poured through an inlet 5 provided on an end of the cavity portion 3 and sealed by closing it with a plug 6.

[0008] Figure 3 illustrates another working example of the present invention. In this case, the cavity portion 3 is provided on the inner side of a top surface 7 in addition to the upper-part outer periphery of the piston 1 of the two-cycle engine. Then, sodium 4 in an amount approximately half of a capacity of the cavity portion 3 is poured into the cavity portion 3 and sealed by closing it with a plug 6, similarly.

[0009] The sodium 4 sealed in the cavity portion 3 is liquefied by the heat of the combustion gas received on the top surface 7 of the piston 1 at a low melting point of 93°C. Then, the sodium 4 in the cavity portion 3 is agitated, the heat received on the top surface 7 is dispersed to a skirt direction on a lower part so as to lower the temperature of the top surface 7, and thermal imbalance of the piston 1 itself can be solved.

(G) Advantageous Effect of the Invention

[0010] As described above, since the present invention is configured as above, the sodium sealed in the cavity portion provided on the upper part of the piston is liquefied by the temperature rise of the piston, prevents the thermal imbalance of the piston itself, and can lower the temperature of the top surface. Moreover, a load of cooling by a fuel of the piston can be reduced, a heat capacity can be made larger with

the same piston weight, and the weight of the piston can be reduced. As a result, troubles such as scuffing of the piston can be prevented, whereby durability is improved."

B. Finding of the Exhibit Ko 1 invention

(A) According to the description in the aforementioned A, in the Exhibit Ko 1 document, it is disclosed that the cavity portion 3 is provided on the inner side of the upper-part outer periphery 2 of the piston 1 in the two-cycle engine, sodium is poured into the cavity portion 3 through the inlet 5, and it is closed by the plug 6.

Moreover, according to Figures 1 to 3 in the Exhibit Ko 1 document, it is found that two recess portions are provided, on a side closer to and on a side farther from the top surface side on the upper-part outer periphery 2 of the piston 1, respectively; the cavity portion 3 is aligned with the two recess portions in a direction toward the upper-part outer periphery 2, that is, in the radial direction; and there is a portion having a pair of holes on a lower part of the cavity portion 3 provided inside the upper-part outer periphery 2 of the piston 1.

By combining a front view (Figure 1) and a side view (Figure 2), since a portion of the upper-part outer periphery 2 of the piston 1 has the same shape including positional relations of the two recess portions, it is found that the upper-part outer periphery of the piston has a shape symmetrical with respect to the circumferential direction thereof, and the two recess portions are two annular grooves on the side closer to and on the side farther from the top surface side, respectively. Moreover, on the basis of the fact that holes held by the pair portions, respectively, are coaxial, and a pair of pin bosses having pin bores aligned with each other along a pin bore part are provided on a lower part of a piston body in an engine in general are matters of common general technical knowledge (not disputable), the hole having a pair of portions can be understood as the pair of pin bosses having the pin bores aligned with each other along the pin bore shaft. According to Figures 1 and 2, the cavity portion 3 has an uppermost surface and a lowermost surface provided on right and left inside the upper-part outer periphery 2 of the piston 1, respectively, and in a front view (Figure 1), there is no inlet 5 or plug 6, and in a side view (Figure 2), the inlet 5 and the plug 6 are provided only on the left cavity portion 3 and thus, it is understood that the cavity portion is continuously annular in the circumferential direction. Moreover, in Figure 1, since a hole (pin bore) penetrates below the cavity portion, the lowermost surface of the cavity portion is located in the vicinity of the upper part of the hole (pin bore), while in Figure 2, since the cavity portion does not interfere with the hole (pin

bore), it can be understood that the cavity portion extends to the skirt portion below, and the lowermost surface of the cavity portion 3 extends lower than the groove farther from the top surface side.

(B) However, the terms "piston ring" and "ring groove" are not used in the Exhibit Ko 1 document, and it is not explicitly indicated that the groove is the ring groove, and neither are the positional relations between the cavity portion 3 and the piston ring.

However, the fact that the piston ring is arranged in the ring groove provided on the upper-part outer periphery of the piston is a matter of common general technical knowledge (not disputable), and there is no circumstance where it should be interpreted that the two annular grooves on the side closer to and on the side farther from the top surface side provided on the upper-part outer periphery 2 of the piston 1 in the Exhibit Ko 1 document are used for purposes other than the ring groove. The Exhibit Ko 1 document has description that "there is nonconformity of occurrence of a ring stick." ([0003]) and "in view of such points, the present invention has an object to obtain a piston of a two-cycle engine which can improve cooling performances by dispersing heat received in the vicinity of the top surface of the piston to a direction of a skirt on a lower side and reduce a piston weight. ([0004])," and since the "ring stick" is a phenomenon occurring between the piston ring and the ring groove into which it is inserted, the Exhibit Ko 1 document has a premise that the piston 1 includes the "piston ring" and the "ring groove". Therefore, a person ordinarily skilled in the art who encounters with the Exhibit Ko 1 document can understand that the two annular grooves on the side closer to and on the side farther from the top surface side provided on the upper part of the piston in the Exhibit Ko 1 invention are the "ring grooves", and the "piston rings" are arranged in these "ring grooves", on the basis of the aforementioned common general technical knowledge. Moreover, according to the above, it can also be easily understood that the cavity portion 3 is arranged by being aligned in the radial direction with the two ring grooves into which the piston rings are fitted.

Thus, it should be considered that the Exhibit Ko 1 document has the description of the aforementioned matters.

(C) According to the above, it is found that the Exhibit Ko 1 document is equal to having the description of the Exhibit Ko 1 invention (aforementioned No. 2, 3(2)A) substantially as found by the present JPO decision.

C. Finding of Common Features and Different Features between the present

amended invention and the Exhibit Ko 1 invention

(A) It is found that there are Common Features and Different Features as found by the present JPO decision between the present amended invention and the Exhibit Ko 1 invention (Aforementioned No. 2, 3(2)B, C).

(B) Plaintiff alleges that the Exhibit Ko 1 document does not describe the configuration of the "piston ring arranged in the ring groove on the side closer to the top surface 7 and the piston ring arranged in the ring groove on the side farther from the top surface 7" and the configuration that "the cavity portion 3 is configured by being aligned in the radial direction with the piston ring arranged in the ring groove on the side close to the top surface 7 and on the side farther from the top surface 7" and thus, the finding by the present JPO decision that they are Common Features is wrong.

However, on the basis of the general common technical knowledge above, the Exhibit Ko 1 document is equal to having the description on the configuration of the "piston ring arranged in the ring groove on the side closer to the top surface 7" and the "piston ring arranged in the ring groove on the side farther from the top surface 7" and the configuration that the cavity portion 3 "is configured by being aligned in the radial direction with the piston ring" as described in the aforementioned B. Even if the aforementioned features are Different Features, they could have been easily conceived of in view of the aforementioned general common technical knowledge.

(2) Judgment on Different Feature 1

E. Exhibit Ko 2 art

(A) The Exhibit Ko 2 document relates to a "piston for an internal combustion engine" and has description on the following matters (for Figure 3 cited in the following description, see the list of Exhibit Ko 2 drawings in the attachment).

"This device relates to a piston for an internal combustion engine, particularly to a piston configured to suppress overrise of a piston temperature during an operation" (page 1, lines 9 to 11).

"This device has an object to provide a piston having a simple configuration that an excellent heat transfer portion is only incorporated in the piston itself without employing a forced cooling method as above.

That is, the gist of this device is characterized in that / a hollow portion is formed in a piston head part by surrounding the head part, and metal with a good heat transfer property is sealed in the hollow portion, and heat on a piston top surface is made to

flow to a piston pin and a piston skirt portion by heat convection of the metal and is lowered" (Page 3, lines 1 to 10, Description).

"In the first working example of the piston according to this device illustrated in Figure 3, in the head part of the piston 1, metal with a good heat transfer property such as metal sodium or mercury is sealed in a cavity in a circumferential direction and a radial direction of the head part" (Page 4, lines 1 to 5, Description).

4. Brief Description of the Drawings / Figures 1 and 2 are schematic diagrams of a conventional oil-jet type piston cooling method, and Figures 3 and 4 illustrate first and second working examples of a cooling-type piston according to this device. / 1 piston, 2 cylinder block / 3 connection rod, 4 oil jet portion / 5 oil passage, 6 jet nozzle / 7, 8, 9 cavity, 9 heat conductive metal (Page 5, lines 5 to 13, Description)

(B) As described above, the Exhibit Ko 2 document describes that a piston for an internal combustion engine has configuration that a hollow portion is formed by surrounding a head part in the piston head part, and metal with a good heat transfer property is sealed in the hollow portion, and the heat on the piston top surface is made to flow to the piston pin and the piston skirt portion by heat convection of the metal and is lowered. Moreover, it is understood from Figure 3 that "a dented portion suspended from a flat uppermost portion of the upper-part combustion surface is included" at the piston head part, and the metal M with a good heat transfer property is sealed in the cavity of the piston head part.

However, the Exhibit Ko 2 document does not explicitly describe the matter that "configured such that a space between the dented portion and the cavity 7 is thin".

However, according to the present application Description, the present amended invention is to optimize the cooling effect for the upper-part combustion surface and the ring belt region by providing an annular sealed cooling cavity configured to be aligned substantially in the radial direction between the first piston ring and the second piston ring for accommodating the cooling medium in order to solve the problem that wear and a physical load to the piston become large by raising the temperature and the compression load in the combustion chamber, whereby a latent service life is shortened ([0002], [0003], [0004], [0014]) and is found to intend to cool not only the ring belt region but also the upper-part combustion surface. The present application Description has the description that "a region in the piston body with a relatively thin material because of the combustion bowl 42 is formed among the combustion bowl 42, the cooling cavity 28, and the lower crown surface 18." ([0010]),

but a person ordinarily skilled in the art can understand that the heat on the upper-part combustion surface by heat conduction can be easily made to escape to the cooling medium by providing the combustion bowl and by installing the top portion proximate to the sealed cooling cavity so as to form the region between the combustion bowl and the sealed cooling cavity thin as the general common technical knowledge and thus, that "a region in the piston body with a relatively thin material is formed" in the present amended invention is understood that a region where the material of the piston body is thin because of inclusion of the dented combustion bowl is formed between the combustion bowl and the sealed cooling cavity in order to improve cooling performance of the upper-part combustion surface.

Then, in the Exhibit Ko 2 art "including the dent portion suspended from the flat uppermost portion of the upper-part combustion surface" of the piston head part, the region caused by the "dented portion" is formed between the "dented portion" of the head part in the piston 1 and the cavity 7, and since the Exhibit Ko 2 art is to lower the heat on the piston top surface by causing it to flow to below the piston and on the basis of the aforementioned general common technical knowledge, it is obvious that such region is formed thin and thus, "configured such that a space between the dented portion and the cavity 7 is thin" is substantially described.

According to the above, it is found that the Exhibit Ko 2 document substantially describes the Exhibit Ko 2 art (aforementioned No. 2, 3(3)) as found in the present JPO decision.

F. Easily conceiving of Different Feature 1

(A) The Exhibit Ko 1 invention is for a two-cycle engine not having a dented combustion chamber, and the Exhibit Ko 1 document has the description that, in the related art, the thickness in the vicinity of the piston top surface is made large in order to withstand the combustion pressure received by the piston top surface ([0002], Figure 4), but since there were nonconformity such as occurrence of scuffing or a ring stick on a sliding surface on the piston outer periphery and nonconformity that the piston weight increased and inertia in the reciprocating motion became large ([0003]), a cavity portion was provided so as to disperse the heat in the vicinity of the top surface to the skirt direction, whereby the cooling performance of the piston is improved, and the weight is reduced ([0004]).

On the other hand, since the Exhibit Ko 2 art is to cause the heat on the top surface of the piston for an internal combustion engine to flow to the piston

skirt portion and to be lowered, the technical field, the problem to be solved, and the operation are in common, and there should be motivation to apply the Exhibit Ko 2 art to the Exhibit Ko 1 invention.

(B) Plaintiff alleges that there is a factor teaching away from applying the Exhibit Ko 2 art to the Exhibit Ko 1 invention with the thickness in the vicinity of the top surface of the piston made thick in a two-cycle engine and providing a dented portion on the piston top portion.

However, Figure 1 in the microfilm of the Utility Model Application No. 1985-64283 (Unexamined Utility Model Application Publication No. 1986-181845) (Exhibit Otsu 7) discloses the configuration in which the dented combustion chamber 1a is provided in the piston crown 1, and Figure 1 of Unexamined Patent Application Publication No. 1990-157461 (Exhibit Otsu 8) discloses the configuration in which the dented combustion chamber a is provided on the upper surface side of the piston crown 12, respectively, and it is found that to provide a combustion chamber having a dented shape on a piston top surface is well known also in the two-cycle engine. Moreover, the Exhibit Ko 1 invention is for dispersing heat to below by providing the cavity portion in order to solve the problem of the piston in the related art, but there cannot be a reason for preventing employment of the configuration of a combustion chamber having a dented shape which is a well-known art in order to solve the problem, and to increase the thickness in the vicinity of the piston top surface cannot be an indispensable configuration and thus, there is no factor teaching away from the application of the Exhibit Ko 2 art.

(C) By applying the Exhibit Ko 2 art to the Exhibit Ko 1 invention, the "dented portion suspended from the flat uppermost portion of the upper-part combustion surface" in the piston head part is provided, and because of provision of this "dented portion", the region with a thin material of the piston body is formed between the "dented portion" of the head part of the piston 1 and the cavity portion and thus, the configuration according to Different Feature 1 could have been easily conceived of.

Thus, Different Feature 1 could have been easily conceived of by a person ordinarily skilled in the art from the Exhibit Ko 1 invention and the Exhibit Ko 2 art.

(3) Judgment on Different Feature 3

As described in the aforementioned (1)B, the Exhibit Ko 1 document

substantially discloses that the cavity portion 3 is arranged by being aligned in the radial direction with the two ring grooves and that the lowermost surface of the cavity portion 3 extends below the lower ring groove.

The Exhibit Ko 1 document has the description on the object to solve the nonconformity such as occurrence of scuffing or occurrence of a ring stick on the sliding surface on the piston outer periphery due to lack of cooling of the piston, and that the cooling performance is improved by dispersing the heat received in the vicinity of the piston top surface to the skirt direction below ([0003], [0004]). Moreover, the role played by the piston ring to transmit the heat of the piston to the cylinder is found to be a matter of common general technical knowledge as in the description in the document titled "Automobile Maintenance Engineering <engine>" (Exhibit Otsu 4. Published on June 30, 1979) that "a compression ring holds tightness of a high-temperature and high-pressure gas between the cylinder and the piston ..., while the heat transmitted from the piston head is made to escape to the coolant" (page 53).

Then, in the Exhibit Ko 1 invention, by also considering the aforementioned common general technical knowledge, a configuration that, in addition to making the heat received in the vicinity of the top surface of the piston escape to the cylinder by heat transfer from the vicinity of the ring groove to the piston ring, it is also made to escape to the sealed cooling space, and in order to effectively disperse it to the skirt direction below, the sealed cooling space arranged by being aligned in the radial direction with the two ring grooves is configured such that the uppermost surface thereof is aligned substantially in the radial direction with the upper ring groove and configured between the upper ring groove and the lower ring groove so as to cover a vertical width of the entire ring groove and moreover, the lowermost surface is extended below the lower ring groove, could have been easily conceived of by a person ordinarily skilled in the art.

Thus, Different Feature 3 could have been easily conceived of by a person ordinarily skilled in the art from the Exhibit Ko 1 invention.

(4) Summary

It is indisputable that Different Feature 2 could have been easily conceived of and thus, according to the above, the present amended invention could have been easily made by a person ordinarily skilled in the art on the basis of the Exhibit Ko 1 invention and the Exhibit Ko 2 art and lacks inventive step.

Thus, the present amendment violates the provisions in Article 126, paragraph 7 of the Patent Act applied mutatis mutandis of Article 17-2, paragraph (6) of the

same Act and should be dismissed under the provisions in Article 53, paragraph (1) of the same Act applied mutatis mutandis of Article 159, paragraph (1) of the same Act.

Moreover, since the present amended invention which includes all the invention specifying matters of the present application invention and has the matters according to Different Feature 1 added could have been easily made by a person ordinarily skilled in the art from the Exhibit Ko 1 invention and the Exhibit Ko 2 art, the present application invention could have been also made easily by a person ordinarily skilled in the art similarly on the basis of the Exhibit Ko 1 invention.

According to the above, the Reason 2 for rescission is not grounded.

4. Conclusion

Therefore, since Plaintiff's claim is not grounded, this shall be dismissed, and the court rules as in the main text.

Intellectual Property High Court, First Division
Presiding Judge: TAKABE Makiko
Judge: KOBAYASHI Yasuhiko
Judge: SEKINE Sumiko

Attachment: List of drawings in present application Description

FIG. 1

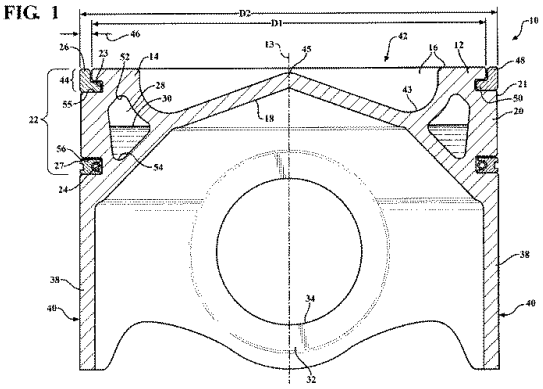


FIG. 2

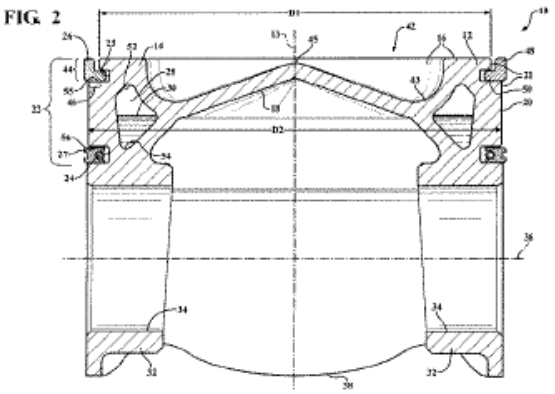
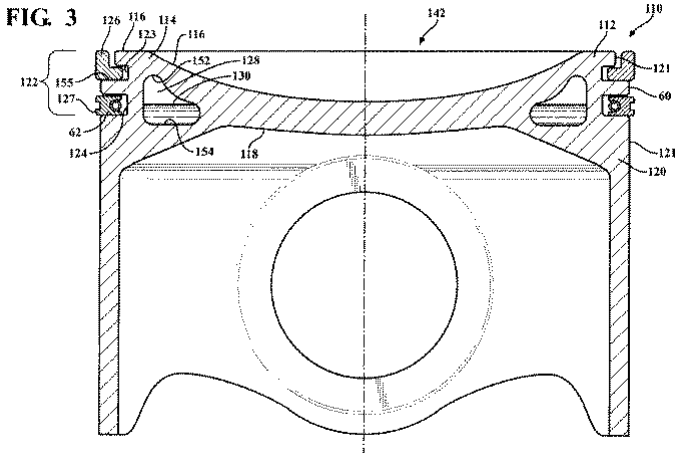
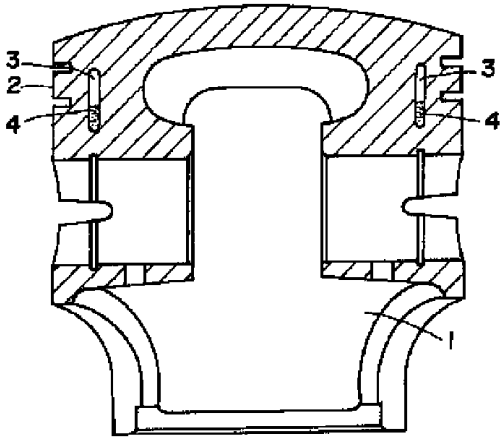


FIG. 3

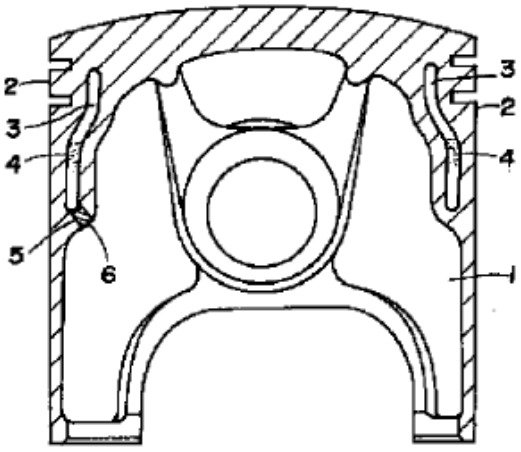


Attachment: List of Exhibit Ko 1 drawings

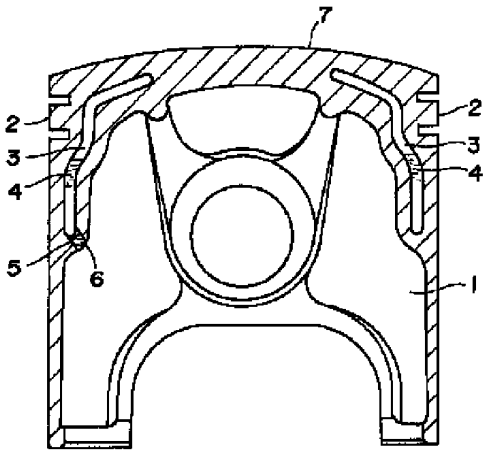
[Figure 1]



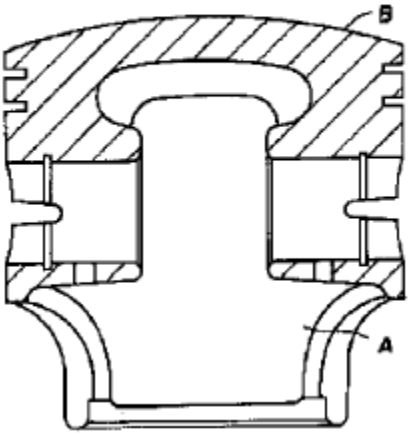
[Figure 2]



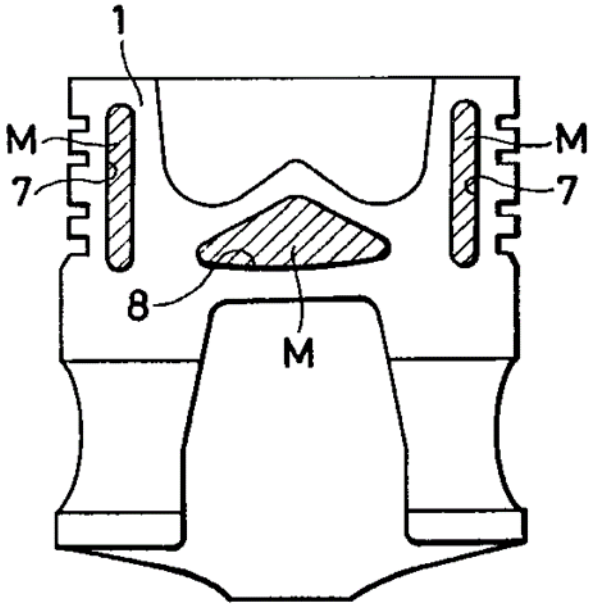
[Figure 3]



[Figure 4]



Attachment: List of Exhibit Ko 2 drawings



[Figure 3]