Trial decision

Invalidation No. 2014-800124

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The case of trial regarding the invalidation of Japanese Patent No. 3775302, entitled "Heat Exchanger", between the parties above has resulted in the following trial decision:

Conclusion

The patent for the inventions according to Claims 1 to 3 of Japanese Patent No. 3775302 is invalidated.

The costs in connection with the trial shall be borne by the demandee.

Reason

No. 1 History of the procedures

Japanese Patent No. 3775302 (hereinafter referred to as the "Patent") relates to Japanese Patent Application No. 2002-14276 filed on January 23, 2002, and concerning the invention relating to Claims 1 to 3 thereof, the establishment of patent right was registered on March 3, 2006.

Against this, to the patent of the inventions relating to Claims 1 to 3 of the Patent, a trial for invalidation of the case (Invalidation No.2014-800124) was demanded by the demandant of the trial for invalidation of the case (hereinafter referred to as the "demandant"), on July 23, 2014, and the body, on August 08, 2014, gave the demandee of the trial for invalidation of the case (hereinafter referred to as

the "demandee") an opportunity to submit a written reply to the trial for invalidation of the case while designating an adequate time limit. However, no response was received from the demandee.

Then, the advance notice of a trial decision was given on December 24, 2014.

No. 2 The patent invention

Inventions relating to Claims 1 to 3 of the Patent (hereinafter, respectively referred to as "patent invention 1" to "patent invention 3") are specified by the following matters described in Claims 1 to 3 of the scope of claims in Japanese Patent No. 3775302.

[Claim 1] A heat exchanger for cooling air in which condensed water is generated by cooling air, comprising:

tubes (1) in which a fluid for cooling air flows; and

fins (2) which are provided on outer surfaces of the tubes (1), and formed in wavy shapes while having plane portions (2a) and bending portions (2b) connecting the adjacent plane portions (2a);

wherein slatted shutter-shaped louvers (2c) are formed on the plane portion (2a);

a pitch size (Fp) of the fin (2) is 3 mm or less; and

a distance (FLp) between louver arrays which is a dimension between a tip end of the louver (2c) and a tip end of a louver (2c) formed on the plane portion (2a) adjacent to the plane portion (2a) formed with the former louver (2c) is 0.86 mm or more.

[Claim 2] The heat exchanger according to Claim 1, wherein the pitch size (Lp) of the louvers (2c) is 0.5 mm or more, and 1 mm or less.

[Claim 3] The heat exchanger according to Claim 1 or Claim 2, wherein of outer dimensions of the heat exchanger (3) comprising the tubes (1) and the fins (2), a dimension (D) of a part parallel with a circulation direction of air is 50 mm or less; and a height dimension (h) of the fin (2) is 7 mm or less.

No. 3 Summary of the demandant's allegation and means of proof

3-1 Summary of the demandant's allegation

The damandant requested the trial decision, "The patent for the inventions described in Claims 1 to 3 according to the scope of claims for patent of Japanese

Patent No.3775302 is invalid. The costs in connection with the trial shall be borne by the damandee", submitted Evidences A No. 1 to A No. 3 as means of proof, and alleges the flowing reasons for invalidation.

Reason 1 : The patent inventions 1 to 3 are identical to the invention described in Evidence A No. 1, and thus a patent should not be granted for the inventions under the provision of Article 29(1)(iii) of the Patent Act. Therefore, the patent relating to the patent inventions 1 to 3 are applicable to Article 123(1)(ii), and should be invalidated.

Reason 2 : The patent inventions 1 to 3 would have been easily made by a person ordinarily skilled in the art, prior to the filing of the application, based on the invention described in Evidences A No. 1, and thus a patent should not be granted for the inventions under the provision of Article 29(2) of the Patent Act. Therefore, the patent relating to the patent inventions 1 to 3 is applicable to Article 123(1)(ii) of the Patent Act, and should be invalidated.

Reason 3 : The patent inventions 1 to 3 would have been easily made by a person ordinarily skilled in the art, prior to the filing of the application, by combining the invention described in Evidence A No. 1 and the invention described in Evidence A No. 2, and thus a patent should not be granted for the inventions under the provision of Article 29(2) of the Patent Act. Therefore, the patent relating to the patent inventions 1 to 3 is applicable to Article 123(1)(ii), and should be invalidated.

3-2 Means of proof
Evidence A No. 1 : Japanese Unexamined Patent Application Publication No. 2000-234892
Evidence A No. 2 : Japanese Unexamined Patent Application Publication No. 2000-154989
Evidence A No. 3 : Japanese Unexamined Patent Application Publication No. 2000-119783

No. 4 Described matters in means of proof
4-1 Described matters in Evidence A No. 1

(A) Claims 1 to 6 describe that "[Claim 1] A method of reducing a heat exchanger which has corrugated fins for promoting heat exchange, in core portions in which a heat exchange medium and outside air perform heat exchange, wherein when core width which is length in a ventilation direction of the core portion is reduced, in order to compensate decline in heat exchange efficiency accompanying the shortening of fin width of the corrugated fins, a fin pitch of the corrugated fins is reduced; and super-hydrophilic treatment in which a contact angle with water becomes generally 7° or less is performed at least on a surface of the corrugated fins.
[Claim 2] A heat exchanger manufactured by the method of reducing the heat exchanger according to Claim 1, wherein the fin pitch of the corrugated fins is 2.0-3.4 mm.
[Claim 3] The heat exchanger according to Claim 2, wherein the corrugated fins are formed with louvers for increasing a surface area; and an interval between the louvers is 0.15-0.80 mm.
[Claim 4] The heat exchanger according to Claim 2 or 3, wherein fin height of the corrugated fins is 4-9 mm.
[Claim 5] The heat exchanger according to Claim 2, 3, or 4, wherein core width of the heat exchanger is 30-56 mm.
[Claim 6] The heat exchanger according to claim 1, 2, 3, 4, or 5, wherein a hydrophilic film containing titanium oxide is formed as the super-hydrophilic treatment."

(B) Paragraph [0001] describes "[Technical field to which the invention belongs] This invention relates to a heat exchanger used for an evaporator and the like of a vehicular air conditioner, and especially to a method of reducing the heat exchanger while maintaining high performance, and the heat exchanger manufactured by this method."

(C) Paragraphs [0002] to [0003] describe that "[Conventional Art] Usually, on the surface of a heat exchanger such as an evaporator, etc., an anticorrosion coat for preventing corrosion or a hydrophilic film for improving a drainage property is provided. As the hydrophilic film, a silica-based film and a resin-based film are mainly used. Under a normal use condition, as organic components, etc., adhered to the surface exist, a contact angle θ (refer to Fig. 10) is about 10-20°.

As corrugated fins used for the heat exchanger above, most of fin pitches (B in Fig. 5(a)) are 3.5 mm or more. This is the fin pitch necessary for ensuring a

drainage property between the fins, and if made to be further small, moisture accumulates in a ventilation space between the fins and prevents ventilation."

(D) Paragraph [0006] describes that "then, an object of this invention is to provide a method of reducing a heat exchanger, which can be reduced while maintaining a fine drainage property and heat exchange efficiency, and the heat exchanger manufactured by the method."

(E) Paragraphs [0010] to [0011] describe that "furthermore, the inventor discovered that there is a relationship as shown in Fig. 6, Fig. 7, and Fig. 8, between the fin pitch, the louver interval, the fin height, and cooling performance, namely heat exchange efficiency. According to this, any of the fin pitch, the louver interval, and the fin height obtains a peak at a certain value, and the cooling performance tends to decline as it separates from the peak. This occurs because a surface area of the fin is decreased as separating from the peak, or although the surface area is increased, air permeability declines.

From the above, it follows that this invention sets the fin pitch within a range of 2.0-3.4 mm (Claim 2), the louver interval within a range of 0.15-0.80 mm (Claim 3), and the fin height within a range of 4-9 mm (Claim 4)"

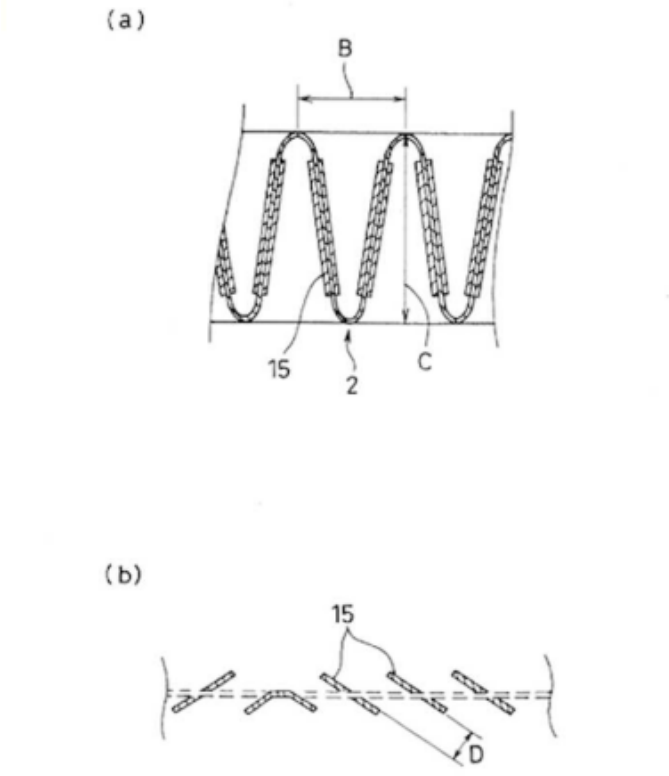
(F) Paragraph [0017] describes that "the heat exchanger 1 used for this embodiment, shown in Fig. 2 and Fig. 3, is formed from an aluminum alloy and used for the evaporator and the like of the vehicular air conditioner. The heat exchanger 1 is configured by alternately laminating the plurality of tube elements 3 internally formed with flow paths within which a coolant circulates, and the plurality of corrugated fins 2 for promoting heat exchange between the coolant and the air."

(G) Paragraph [0020] describes that "the corrugated fin 2 shown in Fig. 4 is formed in a meandering shape, in order to have a large surface area, and plane portions thereof are cut and raised to form louvers 15. As a topological element for changing the surface area of the corrugated fin 2, as shown in Fig. 5(a), (b), there are a fin pitch B, a fin height C, and a louver interval D. The fin pitch B is an interval between respective apex portions of adjacent crest portions facing the same direction , and the fin height C is an interval between respective apex portions of the crest portions facing the opposite directions to each other. The louver interval D is an interval between respective louvers 15 adjacent to each other."

(H) Paragraph [0023] describes that "in the corrugated fin 2 relating to this embodiment, the fin pitch B is formed within the range of 2.0.-3.4 mm which can exert a performance of 70-80% or more, as shown in Fig. 6. The louver interval D is formed in the range of 0.15-0.80 mm (refer to Fig. 7), and the fin height C is formed within the range of 4-9 mm (refer to Fig. 8). By using this corrugated fin 2, while maintaining the heat exchange efficiency and the drainage property, the core width A of the heat exchanger 1 can be reduced to be 30-56 mm."

(I) Paragraph [0026] describes that "the method of reducing the heat exchanger relating to this invention, is not restricted to a laminated-type heat exchanger shown in Fig. 2 and Fig. 3, but can be used even for a Serpentine type one shown in Fig. 9(a), or a tank separated type one shown in Fig. 9(b)."

(J) The description of Fig. 5 is as follows.



(K) Considering the above mentioned matters (G), in Fig. 5, it can be perceived that the corrugated fin 2 has the plane portions formed with the louvers 15, and the bent crest portions which connect the plane portions and adjacent plane portions.

4-2 Described matters in Evidence A No.2

(A) Claim 1 describes that "[Claim 1] An air heat exchanger alternately arranged with a plurality of flat heat transfer tubes (2), (2)..., and corrugated fins (4), (4)..., between headers (3), (3), wherein a plurality of cut and raised pieces (4a), (4a) having a predetermined inclined angle (θ) in an air flowing direction are provided on fin surfaces of the corrugated fins (4), (4)..., and the plurality of cut and raised pieces (4a), (4a)... have the inclined angle (θ) of 25°-40° and a layout pitch (LP) of 0.5 mm-0.9 mm."

(B) Paragraph [0003] describes that "the air heat exchanger 1, as, for example, shown in Fig. 1, is composed of pipe-shaped upper and lower headers 3A, 3B into which or from which a coolant is led in and out; a plurality of flat heat transfer tubes 2, 2...arranged in parallel at predetermined intervals in a longitudinal direction of the headers 3A, 3B, while communicating between the upper and lower headers 3A, 3B; and corrugated fins 4, 4... arranged so as to continuously bend in a generally S-shape in a vertical direction between the plurality of flat heat transfer tubes 2, 2..., and thermally welded to flat heat transfer surfaces of the corresponding flat heat transfer tubes 2, 2... on both sides at bent surface outer ends.

(C) Paragraphs [0007]-[0012] describe that "[Problem to be solved by the invention] Incidentally, although specifications of the corrugated fins 4, 4... shown in Fig. 4 and Fig. 6, such as fin width FW, fin height FH, the length L of the whole of the fin, thickness t, layout pitch (louver pitch) LP of the cut and raised pieces 4a, 4a..., and fin pitch FP, etc., are specifically decided according to dimensions of the whole of the heat exchanger 1 or conditions of used material, concerning the improvement of air side heat transfer performance, especially the cut and raised piece layout pitch (the louver pitch) LP between the cut and raised pieces (the louvers) 4a, 4a... and an inclined angle (the cut and raised angle) θ are important decision factors.

The examination of these two conditions is as follows.

First, if the cut and raised piece layout pitch (the louver pitch) LP is excessively large, its front edge effect cannot be sufficiently utilized, so that, as, for example, shown in characteristics of Fig. 11, a heat transfer rate is deteriorated. On the other hand, if the cut and raised piece layout pitch (the louver pitch) LP is decreased, the front edge effect can be utilized, but on the contrary, the height (louver height) LH of the cut and raised pieces 4a, 4a... shown in Fig. 7 and an interval (a louver interval) LM between the cut and raised pieces 4a, 4a... become small, and air encounters

difficulty in flowing between the cut and raised pieces (the louvers) 4a, 4a..., so that, for example, a value of the heat transfer rate takes a certain maximal value about the cut and raised piece layout pitch (the louver pitch) LP like that shown in the characteristics of Fig.10.

If the inclined angle (the cut and raised angle) θ of the cut and raised pieces (the louvers) 4a, 4a... is small, as the height (the louver height) LH of the cut and raised pieces 4a, 4a... shown in Fig. 7 and the interval (the louver interval) LM between the cut and raised pieces 4a, 4a... become small, air encounters difficulty in flowing between the cut and raised pieces (the louvers) 4a, 4a..., and the heat transfer rate is not good as shown in the characteristics of Fig. 10.

Also, ventilation resistance has generally the same tendency as the heat transfer rate. On the other hand, there is a limit in manufacturing to decrease the layout pitch (the louver pitch) LP of the cut and raised pieces 4a, 4a... as shown in Fig.8 and to increase the inclined angle (the cut and raised angle) θ of the cut and raised pieces 4a, 4a... as shown in Fig 9.

The invention of this application is made to solve such problems, and to provide an air heat exchanger improved in the heat transfer rate on an air side, by finding an appropriate layout pitch LP and inclined angle θ of the cut and raised pieces within a range of numerical value conditions which can be manufactured, and setting those two numerical values in an appropriate relationship."

(D) Paragraph [0016] describes that "if the layout pitch LP of the cut and raised pieces 4a, 4a... is large, the front edge effect cannot be sufficiently utilized as described above, so that the heat transfer rate is deteriorated. On the other hand, if the layout pitch LP is decreased, the front edge effect of the fin can be utilized, but on the contrary, the height LH of the cut and raised pieces 4a, 4a... and the interval LM between the cut and raised pieces 4a, 4a... become small, and air encounters difficulty in flowing between the cut and raised pieces 4a, 4a..., so that the value of the heat transfer rate takes a certain maximal value about the layout pitch LP."

(E) Paragraph [0023]-[0026] describe that "then, if the layout pitch LP is large, the front edge effect of the fin cannot be sufficiently utilized, so that the heat transfer rate is deteriorated. On the other hand, if the layout pitch LP is decreased, the front edge effect of the fin can be utilized, but on the contrary, the height LH of the cut and raised pieces 4a, 4a... and the interval LM between the cut and raised pieces 4a, 4a... become small, and air encounters difficulty in flowing between the cut and raised

pieces 4a, 4a..., so that the value of the heat transfer rate takes a certain maximal value about the layout pitch LP.

If the inclined angle θ which is the cut and raised angle of the cut and raised pieces 4a, 4a... is small, the height LH of the cut and raised pieces 4a, 4a... and the interval LM between the cut and raised pieces 4a, 4a... become small, so that air encounters difficulty in flowing between the cut and raised pieces 4a, 4a, and the heat transfer rate is deteriorated.

Also, the ventilation resistance has generally the same tendency as the heat transfer rate. On the other hand, there is a limit in manufacturing to make the layout pitch LP of the cut and raised pieces 4a, 4a... smaller than 0.5, and make the inclined angle θ larger than 40°.

However, as mentioned above, if the inclined angle θ of the plurality of cut and raised pieces 4a, 4a... of the corrugated fins 4, 4... is made to be 30°-35°, and the layout pitch LP of those is made to be 0.6 mm-0.8 mm, as understood from, for example, the characteristics of Fig. 10, increase in the ventilation resistance is small as compared with the case of Claim 1, and the heat transfer rate with air can be sufficiently improved. Furthermore, in case of the inclined angle θ and the layout pitch LP, even while the heat transfer rate is improved as mentioned above, clogging due to drain water or refuse hardly occurs, and thus the heat transfer rate can be improved as much as possible within a clogging occurrence limitation range. Consequently, heat exchange performance is further effectively improved."

4-3 Described matters in Evidence A No.3

(A) Claims 1, 2 describe that "[Claim 1] An aluminum alloy fin material for a heat exchanger which has high strength and high heat resistance, wherein 0.8-2.0% (% by weight, the same hereinafter) of Mn, 0.2-0.6% of Si, and 0.4-2.0% of Zn are contained; Cu and Fe are respectively regulated to be 0.03% or less and 0.2% or less; the balance is made from Al with inevitable impurities; 600 pieces/μm^3 or more of intermetallic compounds with a diameter within a range of 0.02-0.3 μm are included; intermetallic compounds with a diameter of 3 μm or more are regulated to be 500 pieces/mm^2 or less; an average crystal particle diameter on a surface after brazing and heating is 0.4 mm or more; plate thickness is within a range of 0.03-0.10 mm; and tensile strength is 200 N/mm^2 or more.

[Claim 2] A method of manufacturing the aluminum alloy fin material for the heat exchanger which has high strength and high heat resistance, comprising: making heating temperature before hot rolling within a range of 350-430°C; making hot

rolling finishing temperature 300°C or less; performing primary cold rolling at a rolling ratio of 50% or more after the finishing of the hot rolling; performing intermediate annealing in a temperature area of 200°C-350°C; and then performing final cold rolling to obtain the fin material which has the plate thickness within the range of 0.03-0.10 mm and the tensile strength of 200 N/mm^2 or more, when performing hot rolling on an ingot of an alloy containing 0.8-2.0% of Mn, 0.2-0.6% of Si, and 0.4-2.0% of Zn, respectively regulating Cu and Fe to be 0.03% or less and 0.2% or less, and having the balance made from Al with inevitable impurities, without performing homogenization heat treatment."

(B) Paragraph [0006] describes that "however, if a conventional 3003 alloy is used for the fin material as it is, there is a fact that it cannot sufficiently meet a recent demand for thinning the fin material. Namely, as a conventional fin material for an automobile heat exchanger, for example, a fin material which has a plate thickness of about 0.13 mm was ordinary, but in a recent automobile heat exchanger, it is strongly demanded to further decrease weight and size, so that it is also strongly desired to further thin the fin material for the heat exchanger, specifically thin to be about 0.03-0.10 mm. Therefore, in order to prevent the occurrence of deformation and buckling when molding the fin material, it is demanded to further improve the original plate strength of the fin material before brazing as compared with a conventional one, and it is desired to improve heat resistance (high-temperature buckling resistance) in order to prevent buckling deformation during the brazing at high temperature, but in the conventional 3003 alloy, if thinned to be about 0.03-0.10 mm, the high-temperature buckling resistance is deteriorated for intending to improve strength, so that it is difficult to simultaneously prevent the occurrence of the deformation or buckling of the fin material during assembly of the heat exchanger and the occurrence of bucking due to high temperature during brazing, and finally it must be used by adding an additive element such as Zr, etc. However, if adding the additive element such as Zr, etc., in this way, as mentioned above, an increase in cost is caused, and a purpose range is restricted for scrap processing."

No. 5 Invention described in Evidence A No. 1

In 4-1 (A) above, if the invention relating to Claim 5 citing Claim 4 citing Claim 3 is organized by paying attention to "Heat exchanger,"

the invention of "the heat exchanger which has corrugated fins for promoting heat exchange, in core portions in which a heat exchange medium and outside air

perform heat exchange,

wherein a fin pitch of the corrugated fins is reduced; super-hydrophilic treatment in which a contact angle with water becomes generally 7° or less is performed at least on surfaces of the corrugated fins;

the fin pitch of the corrugated fin is 2.0.-3.4 mm; an interval of louvers formed on the corrugated fin is 0.15-0.80 mm; fin height of the corrugated fin is 4-9 mm; and core width of the heat exchanger is 30-56 mm." is described.

Then, in 4-1 (B), it is described that the heat exchanger is used for an evaporator. Concerning the tube elements and the corrugated fins, in 4-1 (F), it is described that "the heat exchanger 1 is configured by alternately laminating a plurality of tube elements 3 formed with flow paths in which a coolant circulates inside, and a plurality of corrugated fins 2 for promoting heat exchange between the coolant and air." In 4-1 (K), it is described that "the corrugated fin 2 has plane portions..., and bent crest portions which connect the plane portions and adjacent plane portions.", and in 4-1 (G), it is described that "the corrugated fin 2 is formed in a meandering shape, in order to have a large surface area, and the plane portions thereof are cut and raised to form louvers 15." The "coolant" means a "heat exchange medium", and the "air" means "outside air". By synthesizing these descriptions, it can be acknowledged that Evidence A No. 1 describes the following invention.

"A heat exchanger used for an evaporator which has corrugated fins for promoting heat exchange, in core portions in which a coolant and air perform heat exchange, and is configured by alternately laminating a plurality of tube elements 3 internally formed with flow paths in which a coolant circulates, and a plurality of corrugated fins 2 having a plurality of plane portions and crest portions connecting the plane portions adjacent to each other for promoting heat exchange between the coolant and the air,

wherein the corrugated fin 2 is formed in a meandering shape; the plan portions are cut and raised to form louvers 15;

the fin pitch of the corrugated fin is reduced; super-hydrophilic treatment in which a contact angle with water become generally 7° or less is performed at least on surfaces of the corrugated fins;

the fin pitch of the corrugated fin is 2.0-3.4 mm; an interval between the louvers formed on the corrugated fin is 0.15-0.80 mm; fin height of the corrugated fin is 4-9 mm; and core width of the heat exchanger is 30-56 mm."

(hereinafter referred as to "Invention A No. 1")

No. 6 Comparison of the patent invention and Invention A No.1 and Judgement

6-1 Comparison of the patent invention 1 and Invention A No.1

(A) In comparison of the patent invention 1 with Invention A No.1, "a coolant", "corrugated fins 2", "tube elements 3", and "louvers 15" in Invention A No. 1 respectively correspond to "a fluid for cooling air", "fins (2)", "tubes (1)", and "slatted shutter-shaped louvers (2c)" in the patent invention 1, from their structures and functions.

(B) Concerning "a coolant and air perform heat exchange" and "a heat exchanger used for an evaporator "in Invention A No. 1, the evaporator is a heat exchanger which evaporates and expands a liquefied coolant to absorb heat from air, so that the air exchanging heat with the coolant radiates heat to be cooled. Then, it is a technical common sense that, if the air is cooled to dew-point temperature or lower, condensed water condenses on an evaporator surface. Therefore, "a heat exchanger used for an evaporator which has corrugated fins for promoting heat exchange, in core portions in which a coolant and air perform heat exchange" corresponds to "A heat exchanger for cooling air in which condensed water is generated by cooling air" in the patent invention 1.

(C) "A plurality of tube elements 3 internally formed with flow paths in which a coolant circulates" in Invention A No. 1, as the heat exchanger of Invention A No. 1 is the evaporator and the coolant cools the air, corresponds to "tubes (1) in which a fluid for cooling air flows".

(D) The fact that "a plurality of tube elements 3" and "corrugated fins 2 are alternately laminated" in Invention A No. 1 means that the corrugated fin 2 is provided on the outer surface of the tube element 3, and the tube elements 3 and the corrugated fins 2 are further laminated alternately thereon.

"Having a plurality of plane portions and crest portions connecting the plane portions adjacent to each other" means to have one plane portion, and a bent portion for connecting the one plane portion and another plane portion adjacent to the one plane portion.

Furthermore, the fact that "the corrugated fin 2" in Invention A No. 1 is "shaped in a meandering shape" means to be formed in wavy shapes, so that

corresponds to the fact that "a fin" is formed in "waveforms" in the patent invention 1.

Therefore, the fact that "the corrugated fins 2 having the plurality of plane portions and bent crest portions connecting the adjacent plane portions for promoting the heat exchange between the coolant and the air" which is "formed in the meandering shape" and "alternately laminated" "with the plurality of tube elements 3" are provided, in Invention A No.1, corresponds to the fact that "the fins (2) provided on the outer surfaces of the tubes (1), having plane portions (2a) and bent portions (2b) connecting the adjacent plane portions (2a), and formed in the wavy shapes" are provided in the patent invention 1

(E) The fact that "the corrugated fins 2" "are formed with louvers 15 by cutting and raising the plane portions" in Invention A No. 1 corresponds to the fact that "slatted shutter-shaped louvers (2c) are formed on the plane portions (2a)" in the patent invention 1.

(F) The fact that "a fin pitch of the corrugated fin" is "2.0-3.4 mm" in Invention A No. 1 overlappingly accords with the fact that "a pitch size (Fp) of the fin (2) is 3 mm or less" in the patent invention 1.

Furthermore, the patent invention 1 does not specify surface processing of the fin at all, and does not exclude the surface of the fin subjected to super-hydrophilic treatment, so that the fact that "super-hydrophilic treatment in which a contact angle with water becomes generally 7° or less is performed at least on surfaces of the corrugated fins" is not a different feature between the two.

Therefore, the two correspond in the following point and differ somehow in the following point.

<The corresponding feature A>

"A heat exchanger for cooling air in which condensed water is generated by cooling air, comprising:

tubes in which a fluid for cooling air flows; and

fins which are provided on outer surfaces of the tubes, and formed in wavy shapes while having plane portions and bending portions connecting the adjacent plane portions;

wherein slatted shutter-shaped louvers are formed on the plane portions; and

a pitch size of the fin is 3 mm or less"

<The different feature A>

In the patent invention 1, it is specified that a distance (FLp) between louver arrays which is a dimension between a tip end of a louver and a tip end of a louver formed on a plane portion adjacent to a plane portion formed with the former louver, is 0.86 mm or more, whereas, in Invention A No.1, it is specified that the fin pitch of corrugated fin is 2.0-3.4 mm, the interval between the louvers formed on the corrugated fin is 0.15-0.80 mm, and the core width of the heat exchanger is 30-56 mm, but the distance between the louver arrays is not directly specified.

6-2 Judgment about the different feature with the patent invention 1

If examining the above different feature A, the distance (FLp) between the louver arrays of the patent invention is defined as "in this embodiment, Fp/2-Lp×sin (La) is adopted as the distance FLp between the louver arrays." in Paragraph [0026] in the description. (Fp is the pitch size of the fin).

On the other hand, the interval D between the louvers in Invention A No. 1, if presented by using the pitch size Lp of the louvers and an angle La of the louvers to the plane portions of the patent invention, can be presented as (the interval D between the louvers)=Lp×sin(La), and if substituted in the above-mentioned calculation formula of the distance FLp between the louver arrays and replacing the Fp with the fin pitch (B) in Invention A No. 1 corresponding to the Fp, can be presented as the distance FLp between the louver arrays=(the fin pitch B)/2-(the interval D between the louvers).

Then, if calculated from (the fin pitch B) and (the interval D between the louvers) in Invention A No. 1, the distance FLp between the louver arrays is as follows (a list described on the 9th page of a written demand for trial).

D (mm) \ B/2 (mm)	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7
0.15	0.85	0.95	1.05	1.15	1.25	1.35	1.45	1.55
0.20	0.80	0.90	1.00	1.10	1.20	1.30	1.40	1.50
0.25	0.75	0.85	0.95	1.05	1.15	1.25	1.35	1.45
0.30	0.70	0.80	0.90	1.00	1.10	1.20	1.30	1.40
0.35	0.65	0.75	0.85	0.95	1.05	1.15	1.25	1.35
0.40	0.60	0.70	0.80	0.90	1.00	1.10	1.20	1.30
0.45	0.55	0.65	0.75	0.85	0.95	1.05	1.15	1.25
0.50	0.50	0.60	0.70	0.80	0.90	1.00	1.10	1.20
0.55	0.45	0.55	0.65	0.75	0.85	0.95	1.05	1.15
0.60	0.40	0.50	0.60	0.70	0.80	0.90	1.00	1.10
0.65	0.35	0.45	0.55	0.65	0.75	0.85	0.95	1.05
0.70	0.30	0.40	0.50	0.60	0.70	0.80	0.90	1.00
0.75	0.25	0.35	0.45	0.55	0.65	0.75	0.85	0.95
0.80	0.20	0.30	0.40	0.50	0.60	0.70	0.80	0.90

#1 着色部分は FLp≧ 0.86 となる範囲を示す

#1 A colored part indicates a range of FLp≥0.86

In Invention A No. 1, within a range of the fin pitch of 3 mm or less which overlappingly accords with the patent invention, the distances FLp between the louvers of 0.86 mm or more are described, thus the different feature A is not a substantial different feature.

Furthermore, in actuality, the fin and the louver have plate thickness, so that the distance FLp between the louvers arrays which is a dimension between the tip end of the louver and the tip end of the louver formed on the plane portion adjacent to the plane portion formed with the former louver when considering the plate thickness of the fin and the louver, is examined as follows.

The plate thickness of the fin and the louver of Invention A No. 1 is the same, so that, if considering the plate thickness, the interval between the louvers in Invention A No. 1 can be expressed as the interval between the louvers=Lp×sin(La)-(the plate thickness), when expressed by using the pitch size Lp of the louvers and the angle La of the louver to the plane portion in the patent invention. If applied to Paragraph [0026] of the description, the distance FLp between the louver arrays is the distance FLp between the louver arrays=(the fin pitch B)/2-(the interval D between the louvers)-(the plate thickness t of the fin).

The plate thickness t of the fin having the louvers used for the heat exchanger is commonly 0.13 mm, as described in Evidence A No. 3, and if calculated from (the fin pitch B) and (the interval D between the louvers) in Invention A No. 1, the distance FLp between the louver arrays is as follows (a list described on the 10th page of the written demand for trial).

D+t (mm)	B/2 (mm)							
	1.0	1.1	1.2	1.3	1.4	1.5	1.6	1.7
0.28	0.72	0.82	0.92	1.02	1.12	1.22	1.32	1.42
0.33	0.67	0.77	0.87	0.97	1.07	1.17	1.27	1.37
0.38	0.62	0.72	0.82	0.92	1.02	1.12	1.22	1.32
0.43	0.57	0.67	0.77	0.87	0.97	1.07	1.17	1.27
0.48	0.52	0.62	0.72	0.82	0.92	1.02	1.12	1.22
0.53	0.47	0.57	0.67	0.77	0.87	0.97	1.07	1.17
0.58	0.42	0.52	0.62	0.72	0.82	0.92	1.02	1.12
0.63	0.37	0.47	0.57	0.67	0.77	0.87	0.97	1.07
0.68	0.32	0.42	0.52	0.62	0.72	0.82	0.92	1.02
0.73	0.27	0.37	0.47	0.57	0.67	0.77	0.87	0.97
0.78	0.22	0.32	0.42	0.52	0.62	0.72	0.82	0.92
0.83	0.17	0.27	0.37	0.47	0.57	0.67	0.77	0.87
0.88	0.12	0.22	0.32	0.42	0.52	0.62	0.72	0.82
0.93	0.07	0.17	0.27	0.37	0.47	0.57	0.67	0.77

#1 着色部分は FLp≧ 0.86 となる範囲を示す

#1 A colored part indicates a range of FLp≥0.86

Then, in Invention A No. 1, within the range of the fin pitch of 3 mm or less which overlappingly accords with the patent invention 1, the distances FLp between the louver arrays of 0.86 mm or more are described, and thus the different feature A is not a substantial different feature.

6-3 Summary of the patent invention 1

Therefore, the patent invention 1 is Invention A No. 1, and thus a patent should not be granted for the invention under the provision of Article 29(1)(iii) of the Patent Act. Consequently, the patent relating to the patent invention 1 should be invalidated for the reason 1 for invalidation in 3-1 above.

6-4 Comparison of the patent invention 2 and Invention A No. 1

In comparison of the patent invention 2 with Invention A No. 1, both correspond at the corresponding feature A in 6-1, and in addition to the different feature A, differ in the following point.

<The different feature B>

The pitch size (Lp) of the louvers is 0.5 mm or more and 1 mm or less in the patent invention 2, whereas pitch size is not specified in Invention A No. 1.

6-5 Judgment about the different feature with the patent invention 2

The different feature A is described as Invention A No. 1 as described in 6-2, and is not a substantial different feature.

Then, we will examine the different feature B.

Evidence A No. 2 describes that, in the heat exchanger equipped with the corrugated fins the same as in Evidence A No. 1, considering the sufficient utilization of the front edge effect of the louvers and the air flow between the louvers 4a, 4a..., the louver pitch LP is made to be 0.5 mm-0.9 mm to improve the heat transfer rate ((A), (C), (E) in 4-2). Then, "the louvers" and "the louver pitch LP" in Evidence A No. 2 respectively correspond to "the louvers" and "the pitch size (Lp) of the louvers" in the patent invention 2, so that it can be said that Evidence A No. 2 describes that the pitch size of the louvers is made to be 0.5 mm-0.9 mm to improve the heat transfer rate in the heat exchanger equipped with the corrugated fins.

Also, it is a well-known problem in the technical field of a heat exchanger that the heat transfer rate of heat exchange components is improved so as to improve the heat exchange efficiency of the heat exchanger, and concerning the louvers of the heat exchanger of Invention A No. 1, it is naturally considered by a person ordinarily skilled in the art that the heat transfer rate should be further improved. Then, according to the well-known problem, it would have been easily conceived by a person ordinarily skilled in the art that the louver pitch size of Invention A No. 1 is specifically made to be 0.5 mm-0.9 mm as described in Evidence A No. 2; namely, the different feature B of the patent invention 2 is made to be the range 0.5 mm or more and 1 mm or less which overlappingly accords.

An effect given by the patent invention 2 would have been expected from Invention A No. 1 and the matters described in Evidence A No. 2, and it cannot be regarded as a particularly distinguishing effect.

6-6 Summary of the patent invention 2

Therefore, the patent invention 2 would have been easily made by a person ordinarily skilled in the art based on Invention A No. 1 and the matters described in Evidence A No. 2, and a patent should not be granted for the invention under the provision of Article 29(2) of the Patent Act. Consequently, the patent regarding the patent invention 2 should be invalidated for the reason 3 for invalidation in 3-1 above.

6-7 Comparison of the patent invention 3 and Invention A No. 1

In comparison of the patent invention 3 with Invention A No. 1, "the fin height" and "the core width" in Invention A No. 1 respectively correspond to "the height dimension (h) of the fin (2)" and "the dimension (D) of a part parallel with a

circulation direction of air" in the patent invention 3.

Therefore, the fact that "the fin height is made to be 4-9 mm and the core width is made to be 30-56 mm" in Invention A No. 1 overlappingly accords with the fact that "of outer dimensions of the heat exchanger (3) comprising the tubes (1) and the fins (2), a dimension (D) of a part parallel with a circulation direction of air is 50 mm or less; and a height dimension (h) of the fin (2) is 7 mm or less." in the patent invention.

Then, the two correspond in the following point, and differ in the difference feature A of 6-1, or the different feature A and the different feature B of 6-4.

<The corresponding feature B>

"A heat exchanger for cooling air in which condensed water is generated by cooling air, comprising:

tubes in which a fluid for cooling air flows; and

fins which are provided on outer surfaces of the tubes, and formed in wavy shaped while having plane portions and bending portions connecting the adjacent plane portions;

wherein slatted shutter-shaped louvers are formed on the plane portions;

a pitch size of the fin is 3 mm or less; and

of outer dimensions of the heat exchanger equipped with the tubes and the fins, a dimension of a part parallel with a circulation direction of air is 50 mm or less, and the height dimensions of the fin is 7 mm or less."

6-8 Judgment about the patent invention 3

The different feature A is described as Invention A No. 1 as mentioned in 6-2, and is not a substantial different feature.

The different feature B, as described in 6-5, would have been easily made by a person ordinarily skilled in the art.

6-9 Summary of the patent invention 3

Therefore, the patent invention 3 is the invention described in Evidence A No. 1, or would have been easily made by a person ordinarily skilled in the art based on Invention A No. 1 and the matters described in Evidence A No. 2. Consequently, the patent regarding the patent invention 3 should be invalidated for the reason 1 for invalidation in 3-1 or the reason 3 for invalidation.

No. 7 Conclusion

As described above, the patent inventions 1 and 3 are the invention described in Evidence A No. 1, and are applicable to Article 29(1)(iii) of the Patent Act. The patent inventions 2 and 3 would have been easily made by a person ordinarily skilled in the art based on the invention described in Evidence A No. 1 and the matters described in Evidence A No. 2, thus are applicable to Article 29(2) of the Patent Act, and a patent should not be granted for the inventions.

Therefore, the patent regarding the patent inventions 1-3 is applicable to Article 123(1)(ii) of the Patent Act, without examining the reasons 2 and 3 for invalidation regarding the patent invention 1, the reasons 1 and 2 for invalidation regarding the patent invention 2, and the reason 2 for invalidation regarding the patent invention 3, and should be invalidated.

The costs in connection with the trial shall be borne by the demandee under the provisions of Article 61 of the Code of Civil Procedure which is applied mutatis mutandis in the provisions of Article 169(2) of the Patent Act.

Therefore, the trial decision shall be made as described in the conclusion.

April 27, 2015

Chief administrative judge: SENJU, Akio
Administrative judge: SASAKI, Seisho
Administrative judge: YAMAZAKI, Katsushi