Patent Right	Date	May 19, 2021	Court	Intellectual Property High Court, Third Division
	Case number	2019 (Gyo-Ke) 10120		
- A case in which the court found concerning the invention of an oil-cooled screw compressor that a person skilled in the art could have easily conceived of the composition of the Patented Invention that has a non-pressurized route to guide liquid into a thrust piston room by applying well-known art to install a pipe that guides oil to a space for applying pressure to a balance piston without pressurizing the oil, to a publicly-known invention that has the technical problem of generating reverse thrust force, and therefore the court determined that there was an error in the JPO decision ruling that a person skilled in the art could not have easily conceived of the composition of the Patented Invention, and rescinded the JPO decision.				

Case type: Rescission of Trial Decision of Invalidation

Results: Granted

References: Article 29, paragraph (2) and Article 123, paragraph (1), item (ii) of the Patent Act

Numbers of related rights, etc.: Patent No. 3766725. Invalidation Trial No. 2018-800099

Summary of the Judgment

1. The Defendant is the patent right holder of the patent related to an invention titled "Oil-cooled screw compressor" (Patent No. 3766725; number of claims: 2; hereinafter referred to as the "Patent"). The Plaintiff requested a trial for invalidation and sought invalidation of the patent related to the invention stated in Claim 1 (hereinafter referred to as "Patented Invention") (Invalidation Trial No. 2018-800099); however, the Plaintiff received the JPO decision to maintain the Patent and filed this lawsuit to seek rescission of the JPO decision.

2. (1) There was the following difference between the Patented Invention and publicly-known Exhibit Ko 1 Invention concerning the route to guide oil into the space on the thrust bearing side of the balance piston of the screw compressor: in the Patented Invention, the route to guide oil without pressurizing it is installed; however, in publicly-known Exhibit Ko 1 Invention, the route to guide oil that is pressurized by a pump is installed. The top issue regarding the invalidity of the Patent is whether the composition of the Patented Invention related to the aforementioned difference could have been easily conceived of by a person skilled in the art.

(2) Exhibit Ko 1 Invention has a liquid distribution mechanism consisting of a manifold in the intermediate housing, and pump, etc. The JPO decision determined as follows: in Exhibit Ko 1 Invention, newly installing a route to supply part of the liquid that is to be supplied to "all necessary points in the compressor" into the thrust piston room by daring to go around the manifold is against the meaning of adopting an intermediate housing and manifold, that is to minimize the number of liquid pipe connections that are located outside the compressor; in Exhibit Ko 1 Invention, it is possible to use means to supply liquid to a manifold without pressurizing it with a pump in order to adopt the composition of the Patented Invention related to the aforementioned difference; however, since pressurizing liquid with a pump is not only for providing the appropriate force to the thrust piston, but also for supplying liquid flow to all necessary points in the compressor, "designing to supply liquid to a manifold after pressurizing it with a pump" is a basic premise for installation of the intermediate housing and manifold; and therefore, supplying liquid to the manifold without pressurizing it with a pump is against the meaning of adopting an intermediate housing and manifold. In addition, the JPO decision determined as follows: in Exhibit Ko 1 Invention, adopting a composition to guide liquid into a thrust piston room without pressurizing it is a disincentive; even if it is well-known art regarding liquid-cooled screw compressors, to guide oil in an oil pool into the balance piston room without pressurizing the oil, this well-known art cannot be applied to the Exhibit Ko 1 Invention; therefore, even a person skilled in the art could not have easily conceived of the composition of the Patented Invention related to the aforementioned difference. Then, the JPO ruled that the Patent should be maintained.

(3) On the other hand, the judgment in this case found that installing a pipe to guide oil that is collected from the compressor into a space for applying pressure to the balance piston, without pressurizing the oil, in a screw compressor was well-known art before the filing date of the Patent Application. Then, the court determined as follows: the problem of generating reverse thrust force is a problem that is generally arising with screw compressors and the problem can also be recognized in Exhibit Ko 1 Invention; in order to resolve this problem, the motivation to install a non-pressurized route arises; it could have been easily conceived of by a person skilled in the art to apply the aforementioned well-known technical matters and to adopt a non-pressurized route to guide liquid into a thrust piston room; and therefore, the Patent should be invalidated by the trial for patent invalidation and there was an error in the determination of the JPO decision in (2) above. And the court rescinded the JPO decision.

In the judgment in this case, the court found concerning the aggregation of liquid

into a manifold that even if installing a route to supply liquid that is pressurized by a pump without going through a manifold is against the technical idea of Exhibit Ko 1, the idea of installing a route for liquid that is not pressurized by a pump without going through a pump and manifold is not excluded by Exhibit Ko 1 Invention. In addition, the court also found that Exhibit Ko 1 Invention has a liquid distribution mechanism consisting of a manifold in an intermediate housing, pump, and other units to resolve the problem of preventing leakage of gas and liquid outside the compressor and even if a branch of the pipe is installed in the case to install a non-pressurized route into a thrust piston room, the leakage of gas and liquid outside the compressor does not necessarily increase and therefore it is not against the technical idea of Exhibit Ko 1 Invention. Furthermore, the court determined that there is no disincentive to cause the functional failure of a compressor concerning the adoption of a non-pressurized route without going through a pump and manifold.

Judgment rendered on May 19, 2021
2019 (Gyo-Ke) 10120, Case of seeking rescission of the JPO decision
Date of conclusion of oral argument: February 8, 2021

Judgment

Plaintiff: Mayekawa Mfg. Co., Ltd.

Defendant: Kobe Steel, Ltd.

Main text

1. The decision made by the Japan Patent Office (JPO) on August 7, 2019, concerning Invalidation Trial No. 2018-800099, shall be rescinded.
2. The Defendant shall bear the court costs.

Facts and reasons

No.1 Claim

Same as the main text.

No. 2 Outline of the case

1. Outline of procedures at the JPO

The Defendant is a patent holder of the patent (Patent No. 3766725; filed on October 25, 1996; establishment of registration on February 3, 2006; Number of claims: 2; hereinafter referred to as the "Patent") related to an invention titled "Oil-cooled screw compressor."

The Plaintiff requested a trial for invalidation seeking invalidation of the patent related to the invention stated in Claim 1 (Invalidation Trial No. 2018-800099; hereinafter referred to as the "Trial for Invalidation") on August 6, 2018. The JPO made the following decision on August 7, 2019:"The Patent shall be maintained. The trial costs shall be borne by the demandant" (hereinafter referred to as the "JPO Decision"). The JPO delivered a certified copy of the JPO Decision to the Plaintiff on August 16, 2019.

The Plaintiff filed this lawsuit to seek rescission of the JPO Decision on September 13, 2019.

2. Statement of the patent claim

The statement of Claim 1 in the claims related to the description of the Patent (hereinafter referred to as the "Description" including drawings) is as follows (hereinafter

the invention stated in Claim 1 is referred to as the "Patented Invention").

An oil-cooled screw compressor characterized in that it is formed as follows: an oil separation and collection unit is provided on the discharge flow channel wherein the unit separates and collects oil from compressed gas that is discharged with the oil, accumulates the oil in an oil pool at the bottom of the compressor temporarily, and discharges the compressed gas that is separated from the oil; rotor shafts extending on both sides of screw rotors are held rotatably by radial bearings; an input shaft is provided using the rotor shaft on the suction side; the rotor shafts on the discharge side are held rotatably by thrust bearings at a position farther away from the screw rotors than the aforementioned radial bearings; a balance piston is installed on the aforementioned rotor shafts at a position farther away from the screw rotors than the aforementioned thrust bearings; and a partition wall to block pressure is provided between the aforementioned thrust bearings and the balance piston, and a pressure-equalizing flow channel is provided to guide the oil in the oil pool into the space of the balance piston on the side of the partition wall without pressurizing the oil.

3. Summary of the grounds for the JPO Decision

(1) Grounds for the JPO Decision are as stated in the attached written decision (copy).

(2) Grounds for invalidation alleged by the Plaintiff in the Trial for Invalidation are as stated below (JPO Decision, pp. 3 to 4).

A. Grounds for Invalidation 1

The Patented Invention could have easily been conceived of by a person skilled in the art, for example, by applying the well-known art as stated in Exhibits Ko 2 through Ko 5 to the invention stated in Exhibit Ko 1 and it cannot obtain a patent pursuant to the provisions of Article 29, paragraph (2) of the Patent Act. Therefore, the patent in question should be invalidated pursuant to the provisions of Article 123, paragraph (1), item (ii) of the Patent Act.

B. Grounds for Invalidation 2

In the invention stated in Exhibit Ko 1, the Patented Invention could have been invented easily by a person skilled in the art in accordance with the instructions stated in Exhibits Ko 6 and Ko 7 and the Patented Invention cannot obtain a patent pursuant to the provisions of Article 29, paragraph (2) of the Patent Act. Therefore, the patent in question should be invalidated pursuant to the provisions of Article 123, paragraph (1), item (ii) of the Patent Act.

(3) The invention stated in Exhibit Ko 1 that is found by the JPO Decision (hereinafter referred to as "Exhibit Ko 1 Invention") is as follows (JPO Decision, pp. 8 to 9).

A liquid jet screw compressor that is formed as follows: in a discharge flow channel,

it separates and cools liquid from high-pressure gas that is discharged with a liquid, which is oil, and it discharges a high-pressure gas from which liquid is separated; radial sleeve type bearings 52 and 54 rotatably hold shafts 63 and 66 that extend to both sides of a male rotor 12; an input shaft that is connected to the motor is adopted as a shaft 66 on the low-pressure side; an angular contact ball bearing 56 rotatably holds a high-pressure end 63 of the male rotor 12 at a position further away from the male rotor 12 than the aforementioned bearing 54; a thrust piston 62 is installed on the aforementioned high-pressure end 63 at a position further away from the male rotor 12 than the aforementioned angular contact ball bearing 56; there are routes (136, 138, 142, 144, 134, 168 166, 172) that guide the liquid that is separated from the high-pressure gas, cooled and recycled to the compressor, via a pump 140 into a thrust piston room 60, which is a space on the aforementioned angular contact ball bearing 56 side of the thrust piston 62.

(4) Common features and differences found by the JPO Decision by comparing the Patented Invention and Exhibit Ko 1 Invention are as follows (JPO Decision, pp. 18 to 20).

A. Common features

The following points: "an oil-cooled screw compressor that is formed as follows: in a discharge flow channel, it separates and collects oil from compressed gas that is discharged with oil, and it discharges the compressed gas that is separated from the oil; rotor shafts extending on both sides of screw rotors are held rotatably by radial bearings; an input shaft is provided using the rotor shaft on the suction side; the rotor shafts on the discharge side are held rotatably by thrust bearings at a position farther away from the screw rotors than the aforementioned radial bearings; a balance piston is installed on the aforementioned rotor shafts at a position farther away from the screw rotors than the aforementioned thrust bearings; and a route is provided to guide the oil into the space of the balance piston on the side of the thrust bearings."

B. (A) Difference 1

Concerning the point "in a discharge flow channel, it separates and collects oil from compressed gas that is discharged with oil, and it discharges the compressed gas that is separated from the oil," in the Patented Invention, " an oil separation and collection unit is provided on the discharge flow channel" wherein the unit separates and collects oil from compressed gas that is discharged with the oil, accumulates the oil in an oil pool at the bottom of the compressor temporarily, and discharges the compressed gas that is separated from the oil. On the other hand, in Exhibit Ko 1 Invention, it is stated that, in a discharge flow channel, it separates and cools liquid from high-pressure gas that is discharged with a liquid, which is oil, and it discharges a high-pressure gas from which

liquid is separated; however, it is not clear what separates and cools liquid from high-pressure gas and what separates and discharges high-pressure gas from which liquid is separated.

(B) Difference 2

In the Patented Invention, the compressor is formed as follows: "a partition wall to block pressure is provided between the aforementioned thrust bearings and the balance piston" and "a route is provided to guide the oil into the space of the balance piston on the side of the thrust bearings "; however, in Exhibit Ko 1 Invention, it is not clear whether a partition wall to block pressure between the angular contact ball bearing 56 and the thrust piston 62 is installed or not.

(C) Difference 3

Concerning the point that the compressor is formed by providing a flow channel to guide the oil into the space of the balance piston on the side of the thrust bearings, in the Patented Invention, the compressor was formed by providing a pressure-equalizing flow channel "to guide the oil in the oil pool" into the space of the balance piston on the side of the partition wall "without pressurizing the oil"; however, in Exhibit Ko 1 Invention, the compressor is formed by providing routes (136, 138, 142, 144, 134, 168, 166, 172) that guide the liquid that is separated from the high-pressure gas, cooled and recycled to the compressor via the pump 140 into the thrust piston room 60, which is a space on the aforementioned angular contact ball bearing 56 side of the thrust piston 62.

(5) Summary of determination of the JPO Decision on the grounds for invalidation

Summary of determination of the JPO Decision on the grounds for invalidation is as follows.

A. Grounds for Invalidation 1

(A) Difference 1 (oil separation and collection unit) (JPO's Decision p. 20)

In Exhibit Ko 1, there is no clear statement on the "oil separation and collection unit"; however, it is common general technical knowledge related to oil-cooled screw compressors, as stated in Exhibits Ko 6, Ko 8, and Ko 9, to equip oil separation and collection unit as a means to separate and collect oil from compressed gas that is discharged with oil and to discharge compressed gas from which oil is separated. It is obvious according to common general technical knowledge that Exhibit Ko 1 Invention has an oil separation and collection unit. Therefore, Difference 1 is not a substantive difference.

(B) Difference 2 (partition wall to block pressure) (JPO Decision, p. 24)

The space where the angular contact ball bearing 56 is placed has a lower pressure than the thrust piston room 60 and there is a pressure difference between the relevant

space and the thrust piston room 60. Moreover, there is a statement in lines 22 to 25 of Column 6 of Exhibit Ko 1 that "pressurized liquid, such as liquid injected from the compressor, is guided into the room 60, acts on the piston 62, and offsets force in the thrust direction with high-pressure gas that acts on the end 64 of the rotor 12," and hence, in Exhibit Ko 1 Invention, it is reasonable to construe that the parts 7, 5, and 4 have the function of "partition walls" that block pressure between the thrust piston room 60 and the space where the angular contact ball bearing 56 is placed to the extent of offsetting the force in the thrust direction that acts on the thrust piston 62 as a whole with pressure in the thrust piston room 60. Therefore, Exhibit Ko 1 Invention has parts equivalent to the "partition wall" of the Patented Invention and this point is not a substantive difference.

(C) Difference 3 (non-pressurized flow channel) (JPO Decision, p. 25)

In Exhibit Ko 1 Invention, newly installing a route to supply part of the liquid to be supplied to "all necessary points in the compressor" into the thrust piston room 60 by daring to go around the manifold 134 is against the meaning of adopting the intermediate housing 30 and the manifold 134, which is to minimize the number of liquid pipe connections that have to be located outside the compressor.

In Exhibit Ko 1 Invention, it is possible to use means to supply liquid to the manifold 134 without pressurizing it with the pump 140 in order to adopt the particular matters of the Patented Invention related to Difference 3; however, pressurizing liquid with the pump 140 is not only for providing the appropriate force to the thrust piston 62, but also for supplying liquid flow to all necessary points in the compressor. Therefore, "designing to supply liquid to the manifold 134 after pressurizing it with the pump 140" is a basic premise for installation of the intermediate housing 30 and the manifold 134. Supplying liquid to the manifold 134 without pressurizing it with the pump 140 is also against the meaning of adopting the intermediate housing 30 and the manifold 134.

Therefore, in Exhibit Ko 1 Invention, it can be said that adopting a composition to guide liquid into a thrust piston room without pressurizing it is a disincentive. Therefore, even if Exhibits Ko 2 through Ko 5 contain statements regarding the introduction of oil in the oil pool into the balance piston room without pressurizing it and these matters are well-known art regarding the liquid-cooled screw compressor, it is impossible to apply Exhibits Ko 2 through Ko 5 to Exhibit Ko 1 Invention and even a person skilled in the art cannot obtain the particular matters of the Patented Invention related to Difference 3.

(D) Whether Grounds for Invalidation 1 have been established or not (JPO Decision, p. 26)

The Patented Invention could not have been easily invented by a person skilled in the art by applying well-known art stated in Exhibits Ko 2 through Ko 5 to Exhibit Ko 1

Invention. Therefore, the Patent cannot be invalidated based on the Grounds for Invalidation 1.

B. Grounds for Invalidation 2 (JPO Decision, pp. 26 to 27)

As shown in Difference 3 concerning Grounds for Invalidation 1, in Exhibit Ko 1 Invention, it can be said to be a disincentive in consideration of the technical idea stated in Exhibit Ko 1 to supply liquid into the thrust piston room 60 after letting the liquid passing through the filter 146 or a different filter without passing through the pump 140 and the manifold 134. Therefore, in Exhibit Ko 1 Invention, the Patented Invention could not have been easily conceived of by a person skilled in the art according to the instructions stated in Exhibits Ko 6 and Ko 7. Therefore, the Patent cannot be invalidated based on the Grounds for Invalidation 2.

(omitted)

No. 4 Judgment of this court

1. Inventions and technical matters stated in publications distributed before filing of the Patent Application

(1) Exhibit Ko 1

A. Matters stated in Exhibit Ko 1

Exhibit Ko 1 is a publication distributed before the filing date of the Patent Application (Examined Patent Application Publication No. 1976-36884) as shown in the Attachment. It is a publication of the examined application related to "helical screw compressor" and it is stated as follows in Exhibit Ko 1 with drawings.

(A) "This invention is related to a liquid jet screw compressor with modifications to the housing." (Column 2, line 24 and line 25)

(B) "As a problem related to the existing liquid jet screw compressor, there is leakage of gas and injection liquid from many pipe connections that are usually required, or from joints equipped with a flange between the compressor housing parts. Leakage of compressed gas outside the compressor is not preferable particularly when it occurs in a sealed device or when the gas is harmful or combustible. Of course, leakage of injection liquid is also undesirable. Therefore, it is preferable to minimize the number of joints in the compressor housing so that joints can be sealed easily." (Column 3, line 19 through line 30)

(C) "This invention aims to minimize the number of joints necessary for sealing and to modify the housing structure for the liquid jet helical gas compressor that is equipped with a liquid distribution device that is almost contained in the compressor housing.

This invention also aims to provide a housing structure for a helical screw gas compressor that uses a slide valve capacity control device. The injection case unit is structured independently as a metal part that is assembled to contain the screw rotor and constitutes a room for gas that is supplied by a compressor injection gas and capacity control valve. The assembled case unit is also structured to hold a compressor unit on the frame and the entire compressor can be removed without hindering the consistency with the case unit concerning the compressor driving motor.

In this invention, the intermediate housing part constitutes a support for a basic compressor and provides a housing structure for a liquid jet helical screw compressor so that the compressor can be easily removed from the assembled case unit. The intermediate housing parts also has liquid distribution holes or manifolds to minimize the number of liquid pipe connections that must be located outside the compressor. Liquid distribution holes are placed in the intermediate housing part along with the sealable case unit that is installed on the intermediate housing part and almost all liquid pipes located in the sealed area, which is usually exposed to gas-liquid mixture of the compressor, are connected to the holes. In addition, the compressor housing structure in this invention has an attractive appearance and can easily provide sound absorption with an insulation layer or coating on the outside." (Column 4, line 8 through line 42)

(D) "As obvious from Figure 3, the male rotor 12 is rotatably supported by the radial sleeve type bearing 52 on the low-pressure end side of the rotor and the similar bearing 54 on the high-pressure end side of the rotor. The bearings 52 and 54 are located in the bearing housing 34 and the intermediate housing 30, respectively. The force in the direction of the shaft that affects the rotor 12 is partially received by a pair of the angular contact ball bearings 56. The bearings 56 are appropriately installed in the bearing housing 58 and the housing 58 is anchored with bolts in a detachable manner to the intermediate housing 30 on the second traverse plane 59 that is distant from and parallel to the plane 32. The bearing housing 58 has the cylindrical room 60 and has the thrust piston 62 that is attached to the high-pressure end part 63 of the male rotor 12 in the room 60. Pressurized liquid like compressor injection liquid is guided into the room 60, affects the piston 62, and offsets the force in the thrust direction by high-pressure gas that affects the end plane 64 of the rotor 12. The end part on the opposite side of the rotor 12 has a pair of the shaft parts 66 and the motor is connected to it with the coupling 68 as shown in Figure 1. The female rotor 14 is supported by sleeve bearing and thrust bearing (not shown in the figure) that is a rotating part in the same way." (Column 6, line 6 through line 31)

(E) "As mentioned above, the compressor 10 is a well-known type where liquid is injected

into an operating room that is formed by the holes 18 and 20 so that liquid is mixed with compressed gas in order to absorb some compression heat and to seal the clearance between the rotors 12 and 14 that work harmoniously. Appropriate oil is usually used as the liquid and it functions as a lubricant for two rotors that engage each other and for rotor bearings. The liquid that is directly injected into the compressor operating room and is used as a lubricant is discharged with high-pressure gas, separated from the gas, cooled, and recycled to the compressor as has been well-known." (Column 9, line 17 through line 28)

(F) "According to the invention, a housing structure equipped with a modified liquid distribution mechanism that is almost contained in the cases 98 and 114 is provided in order to minimize the leakage of liquid outside the compressor. The intermediate housing 30 in the compressor 10 has multiple routes to supply liquid to various positions in the compressor. The intermediate housing 30 also has a space or the manifold 134 to distribute pressurized liquid. In particular, in Figure 3 through Figure 7, liquid is guided to the appropriate pump 140 that is driven by the extended part, which is not shown in the figure, of the female rotor via the pipe 136 and the route 138 in the intermediate housing 30. The pump 140 increases liquid pressure that is enough to provide appropriate force to the thrust piston 62 and to supply liquid flow to all necessary points in the compressor. The discharge pipe 142 of the pump 140 is connected to the route 144 of the intermediate housing 30 that is connected to the filter 146, which is secured on the housing. Liquid that passes through the filter 146 flows into the space 134 in the intermediate housing.

The space 134 functions as an operating room that is formed by compressor bearing, seal, thrust piston, and the crossing holes 18 and 20, and as a manifold to distribute pressurized liquid into the room 70 of the driver for the capacity control valve 42. Pressurized liquid is supplied from the space 134 to the room 70 via the pipes 148 and 150, the route 152, and the pipe 154. The appropriate valve 156 is inserted into the pipe 148 and controls pressurized liquid flow against the room 70 of the capacity control valve driver. The valve 158 is placed in the pipe 160 to send pressurized liquid into the room 70. The pipe 160 is connected to the pipe 150 and the route 162 of the intermediate housing that is open onto the inner space 102 of the case 98. Most of the liquid that is discharged into the space 102 is mixed with the injected gas flowing into the compressor operating room accidentally. The space 134 is also connected to the pressure reduction valve 164 as shown constitutively in Figure 5 and Figure 7. The pressure reduction valve 164 controls liquid pressure in the space 134 and sends liquid to the space 116 of the case 114. The pressure reduction valve 164 is a valve to affect the pressure difference between the space 116 and the space 134.

As shown in Figure 5, the space 134 has the part 166 that is mutually connected to the route 168 and also has the route 170 that leads to the bearing 54 that is located in the intermediate housing 30. The pipe 172 leads to the thrust piston room 60 from the space part 166 and supplies pressurized liquid that affects the thrust piston 62. As shown in Figure 3, liquid that leaks through the periphery of the thrust piston to the room 174 that is formed by the cover part 175 is discharged from the room by the pipe 176 that is connected to the pipe 178, which leads to the hole 20 via an appropriate route of the intermediate housing. The pipe 180 that is connected to the space part 166 also supplies liquid to the bearing 52 in the bearing housing 34 and to the thrust piston of the female rotor 14 that is located as mentioned above in the bearing housing 34 in the same way. Liquid is also supplied to the shaft seal assembly 108 via the pipe 182 and is discharged to the pipe 178 via the connection pipe 184.

Liquid that is discharged from a compressor bearing or thrust piston and the seal 108 flows into the operating room that consists of the crossing holes 18 and 20." (Column 9, line 29 through Column 11, line 9)

(G) "As it is obvious based on the aforementioned liquid injection and lubrication mechanism, the distribution space or manifold is installed in the intermediate housing 30 and almost all pipes are located in the cases 98 and 114. This will eliminate most of the leakage of injection liquid outside the compressor 10." (Column 12, line 13 through line 18)

B. Matters that are understood based on the statements in Exhibit Ko 1

(A) Regarding screw compressors, gas is compressed and discharged by a rotor, while oil is supplied to the rotor for lubrication, etc. Therefore, it is common general technical knowledge to separate liquid from high-pressure gas in which liquid is contained and to discharge high pressure gas from which liquid is separated in the discharge flow channel of a screw compressor. According to the statements in the aforementioned A. (A) and (E) and the aforementioned common general technical knowledge, it can be understood that the discharge flow channel of the liquid jet screw compressor separates and cools liquid from high-pressure gas that is discharged along with liquid (oil) and discharges high-pressure gas from which liquid is separated.

(B) According to statements in the aforementioned A. (D) and Figure 3, it can be understood that the radial sleeve type bearings 52 and 54 rotatably hold the shaft parts 63 and 66 that extend on both sides of the male rotor 12 and the input shaft that is connected to the motor is used as the shaft part 66.

(C) According to statements in the aforementioned A. (D) and Figure 3, it can be understood that the angular contact ball bearing 56 rotatably holds the high-pressure end

part 63 of the male rotor 12 at a position further away from the male rotor 12 than the bearing 54.
(D) According to statements in the aforementioned A. (D) and Figure 3, it can be understood that the thrust piston 62 is installed on the high-pressure end part 63 at a position further away from the male rotor 12 than the angular contact ball bearing 56.
(E) According to statements in the aforementioned A. (F) and Figure 3, Figure 5, and Figure 7, it can be understood that the compressor is formed by installing routes (136, 138, 142, 144, 134, 168, 166, 172) that guide the liquid that is separated from the high-pressure gas, cooled, and recycled to the compressor via the pump 140 into the thrust piston room 60, which is a space on the angular contact ball bearing 56 side of the thrust piston 62.
C. Invention stated in Exhibit Ko 1

According to the matters stated in Exhibit Ko 1 (A. above) and the matters that can be understood based on the statements in Exhibit Ko 1 (B. above), it is found that Exhibit Ko 1 Invention (No.2, 3. (3) above) is stated in Exhibit Ko 1 as found by the JPO Decision.
(2) Exhibit Ko 2
A. Matters stated in Exhibit Ko 2

In Exhibit Ko 2 (Examined Patent Application Publication No. 1982-159993) that is a publication distributed before the filing date of the Patent Application, it is stated as follows with drawings.
(A) "This invention is related to a balance piston that offsets thrust in the direction of a shaft that is generated during operation of jet screw compressors where air is compressed by rotating a pair of screw rotors that engage mutually in a rotor room." (page 1, lower right column, line 11 through line 15)
(B) "In the past, as shown in Figure 1 of longitudinal sectional view, including male rotor, this type of compressor has a suction side end wall and discharge side end wall on the sides of the rotor casing 1; it is sealed by the suction casing 2 and the discharge casing 3; the male rotor 4 and the female rotor (that is not shown in the figure) engage each other; and both rotors come into contact with the bicircular outer periphery on the discharge side of the casing 1. The male rotor 4 is supported by the journal bearing 6 in the suction casing 1, the journal bearing 8 in the discharge casing 3, and the thrust ball bearing 12, and is sealed by the shaft seal device 18, and a drive end protrudes outside the compressor. The shaft part 4b of the bearing 6 side is extended; the balance piston 32 is secured on the shaft end; and it is designed to rotate itself by sliding it into the suction casing 2 directly or inside the secured cylinder. 22 is a suction route and 25 is a discharge route. The female rotor side is rotatably supported by a shaft that does not protrude outside the compressor

in the same way and does not have a balance piston. 31 is a slide valve. When the screw compressor is operated, the male rotor 4 and the female rotor engage and the operating space between them moves to the discharge side. Coolant is compressed and discharged to the discharge route 25 from a discharge outlet. On the other hand, the oil for lubrication, cooling, and sealing between the bearing and the rotor and between the rotor and the rotor casing 1 enters into the oil separator 52 along with discharged gas through the discharge pipe 50; the oil is separated in the separator and sent to the oil cooler 55 by the oil pipe 53 and cooled; then the oil is filtrated by the filter 56; the oil is pressured by the oil pump 57; and then the oil is sent to a rotor operating space via the bearings 6, 8, 12, etc., the bearing sealing device 18, the slide valve 31, and other units. Pressurized oil sent from the oil pump 57 in the same way is sent to the balance piston room 34 to balance the arising thrust of the rotor. These oil supplies come into the discharge route 25 again and merge." (page 1, lower right column, line 16 through page 2, upper right column, line 10)

(C) "This balance piston of the existing screw compressor supplies pressurized oil for lubrication, cooling, and sealing that is pressurized by an oil pump as operating oil and therefore it had the following defects.

(1) ...

(2) In particular, high-pressure oil that is discharged by an oil pump is supplied to a balance piston before the pressure difference between suction side and discharge side of the compressor at start-up becomes high. Therefore, the rotor is pushed to the discharge side, excess stress is applied to the thrust bearing and thrust bearing holding plate, etc., and it is repeated whenever the compressor is started up. Consequently, it may cause fatigue deformation. In addition, the rotor discharge side end plane and discharge casing end plane come into contact; both end planes may be damaged or may produce heat; and radial bearing metal may melt due to the heat and it may outflow.

(3) ..." (page 2, upper right column, line 11 through lower left column, line 15)

(D) "This invention was made in consideration of problems related to the existing pressurizing method of balance pistons of screw compressors. It aims to obtain a balance piston pressurizing method that balances rotor thrust due to changes in discharge pressure so that the rotor does not transfer not only during start-up and operation, but also at any time, and oil pump capacity does not increase." (page 2, lower left column, line 16 through lower right column, line 2).

(E) "This invention is a screw compressor with the following features: oil for lubrication, cooling, and sealing is collected by an oil separator along with discharged fluid; the oil is supplied to parts of the compressor by an oil pump; the oil to which the discharge pressure of the compressor is applied is supplied on the opposite discharge side of the piston by

inserting a piston that is secured on the rotor shaft and a cylinder that is secured on the suction casing into a space where the rotor shaft end that is installed on the suction casing protrudes, with little clearance." (page 2, lower right column, line 3 through line 11)

(F) "Figure 5 is a drawing indicating an oil pressure circuit diagram. Compressed gas that contains plenty of oil that is discharged in the discharge route 25 goes through the discharge pipe 50, is guided into the oil separator 52, and is separated into compressed gas and oil. Then, the compressed gas is discharged from the pipe 51 and oil is guided into the oil cooler 55 by the oil pipe 53." (page 4, lower left column, line 14 through line 19)

(G) "Part of the oil that is separated by the oil separator 52 is sent to the balance piston room 34 through the pipe 58 that has the filter 59 in the middle. Therefore, oil pressure that changes in accordance with the discharge compressed gas pressure is supplied to the Balance Piston 32." (page 4, lower right column, line 7 through line 11)

B. Matters that are understood based on the statements in Exhibit Ko 2

According to the statements in Figure 5 of Exhibit Ko 2, it can be understood that the pipe 58 can guide oil from the oil separator 52 into the balance piston room 34, without pressurizing it.

C. Technical matters stated in Exhibit Ko 2

According to the matters stated in Exhibit Ko 2 (A. above) and the matters that can be understood based on the statements in Exhibit Ko 2 (B. above), it is found that the following technical matters are stated in Exhibit Ko 2.

"The existing screw compressors, which supply pressurized oil for lubrication, cooling, and sealing that is pressurized by an oil pump into a balance piston as operating oil, had a problem in particular at start-up where high-pressure oil that is discharged by an oil pump is applied to the balance piston before the pressure difference between the suction side and the discharge side of the compressor becomes high, and therefore, the rotor is pushed to the discharge side and excess stress is applied to the thrust bearing and the thrust bearing holding plate, etc. In order to resolve this problem, a screw compressor is formed with the following features: oil is separated and collected from compressed gas that contains plenty of oil; the oil separate 52 that sends compressed gas from which oil is separated is installed on the discharge pipe 50; and the pipe 58 that guides oil from the aforementioned oil separator 52 without pressurizing it into the balance piston room 34 that faces the balance piston 32 to balance the thrust of the male rotor 4 and the female rotor 5 is installed on the end of the shaft part 4b."

(3) Exhibit Ko 3

A. Matters stated in Exhibit Ko 3

In Exhibit Ko 3 (International Publication No. 95/10708), which is a publication distributed before the filing date of the Patent Application, it is stated as follows with drawings (translation is based on the JPO Decision).

(A) "Through the known devices in normal cases, appropriate reduction of the thrust load is attained. A problem, however, arises when the outlet pressure varies and in particular when also the inlet pressure varies. Under such working conditions, axial gas forces will vary with the result that the rotor might be under- or overbalanced, depending on how the balancing piston is dimensioned and on the various working conditions. The result will be a decrease in the running life of the thrust bearings" (page 1, line 7 through line 12)

(B) "The object of the present invention is to attain simple and reliable means for an automatic adaptation of the thrust balancing force to various working conditions in a compressor in question, in particular for operating with high inlet and outlet pressures. (page 1, line 25 through line 27)

(C) "The compressor 1, which is of the rotary screw type with a pair of intermeshing screw rotors, has a low pressure inlet 2 and a high pressure outlet 3. One of the rotors is provided with a shaft extension 15 connected to driving means not shown, the shaft extension having a balancing piston 11 in a cylinder 14. The compressor is oil injected, and in the outlet pipe 8, there is an oil separator 10. From the oil separator, the gas escapes through the delivery pipe 9, and the separated oil flows back to the working space through a pipe 6 and the oil injection means 4. The pipe 6 is provided with a first throttle 5 adjacent to the oil separator, and the oil injection means constitutes a second throttle 4. Between the first 5 and second 4 throttles, a branch pipe is connected to the pipe 6, which branch pipe ends in the cylinder 14." (page 2, line 18 through line 26)

(D) "At operation, there will be an axial gas force F acting on each rotor in a direction from the high pressure end to the low pressure end of the compressor, i.e. leftwards in the figure, which gas force is a function of p_s and p_d. The balancing force F_b from the piston 11 depends on the effective pressure area 12 of the piston and is a function of p_s and p_d. The balancing force should be smaller than the gas force and thus leave a resultant force $F_R = F - F_B$ to be taken up by the thrust bearings. It is desirable that the resultant force lies within a certain range $F_{min} < F_R < F_{max}$), where F_{min} and F_{max} are determined by the load requirements of the thrust bearings." (page 3, line 7 through line 14)

B. Matters that are understood based on the statements in Exhibit Ko 3

(A) According to the statements of the aforementioned A. (C) and the drawings, it can be understood that oil is separated and collected from compressed gas that is discharged with oil, the oil is accumulated temporarily in the oil pool that is at the bottom of the compressor, and the oil separator 10 that sends compressed gas from which oil is

separated is connected to the outlet pipe 8.
(B) In reference to the drawings in Exhibit Ko 3, it can be understood that an oil pressure pump is not installed on the pipe 6 and the branch pipe 7 and it is designed to guide oil "without pressurizing it" from the oil separator 10 to the first pressure surface 12 side of the balancing piston 11 of the cylinder 14.

In addition, it is stated that oil is returned to the operating space via the oil injection means 4. Therefore, it is possible to say that this screw compressor is an oil-cooling type.
C. Technical matters stated in Exhibit Ko 3

According to the matters stated in Exhibit Ko 3 (A. above) and the matters that can be understood based on the statements in Exhibit Ko 3 (B. above), it is found that the following technical matters are stated in Exhibit Ko 3 as found by the JPO Decision (JPO Decision, p. 12).

"An oil-cooled screw compressor 1 that is formed with the following features: oil is separated and collected from compressed gas that is discharged with oil; oil is accumulated temporarily in the oil pool that is at the bottom of the compressor; and the oil separator 10 that sends compressed gas from which oil is separated is connected to the outlet pipe 8; the pipe 6 and the branch pipe 7 that guide oil without pressurizing it from the aforementioned oil pool to the first pressure surface 12 side of the balancing piston 11 of the cylinder 14."
(4) Exhibit Ko 4
A. Matters stated in Exhibit Ko 4

In Exhibit Ko 4 (Examined Patent Application Publication No. 1982-122188) that is a publication distributed before the filing date of the Patent Application, it is stated as follows with drawings.
(A) "(7) Concerning the balancing method of rotor shaft thrust by cooling and lubricating the bearings of an oil injection type screw compressor that is stated in any one of Claims 1 through 6, the balancing method of the rotor shaft thrust in order to balance the aforementioned screw rotor shaft by cooling and lubricating the bearings of the oil injection type screw compressor that is featured by the following: pressurized oil is supplied into the pressurized space that is close to the shaft end 20 of the screw rotor that is on the aforementioned low-pressure side." (Claim 7)
(B) "(11) Concerning the balancing method of rotor shaft thrust by cooling and lubricating the bearings of an oil injection type screw compressor that is indicated in any one of Claims 7 through 10, the balancing method of the rotor shaft thrust by cooling and lubricating bearings of an oil injection type screw compressor that has the following features: pressure of oil that is supplied into the pressurized space of the aforementioned

screw rotor is almost the same as outlet pressure of the aforementioned screw compressor." (Claim 11)

(C) "On the low-pressure side of the compressor, optimally roller bearing type radial bearings and optimally angular contact ball bearing type axial bearing 18 are built in to support the screw rotor 15. The balance piston 19 is equipped on the rotor shaft end 20 outside the shaft built-in part to balance the main part of the shaft force that affects the high-pressure end of the screw rotor 15. The aforementioned balance piston 19 is located at the pressurized space 21 and pressure oil is supplied from outside into the pressurized space 21 via the oil inlet hole 22." (page 3, lower right column, line 1 through line 10)

(D) "Oil is supplied into the pressurized space 21 of the balance piston 19 of the screw rotor 15 and the pressure of the oil corresponds to the outlet pressure of the screw compressor, which is depressurized by decreasing the pressure of oil cooler and oil filter." (page 4, lower left column, line 12 through line 15)

(E) "Counterpoise is supplied from equipment related to this invention on the screw rotor that has a high force in the shaft direction; the counterpoise increases as adverse pressure in the compressor increases; and thereby bearing force and therefore bearing life are substantively constant." (page 5, upper right column, line 19 through lower left column, line 3).

B. Technical matters stated in Exhibit Ko 4

According to matters stated in A. above, it is found that the following technical matters are stated in Exhibit Ko 4.

"Oil injection type screw compressor that is formed by installing the oil inlet hole 22 to guide oil with pressure that responds to the outlet pressure of a screw compressor, which decreased by pressure decrease in the oil cooler and oil filter, into the pressurized space 21 that faces the balance piston 19."

(5) Exhibit Ko 5

A. Matters stated in Exhibit Ko 5

In Exhibit Ko 5 (microfilm in Utility Model Application No. 1987-128114 (Unexamined Utility Model Application Publication No. 1989-34493)) that is a publication distributed before the filing date of the Patent Application, it is stated as follows with drawings.

(A) "In order to resolve the aforementioned problems, this idea can simplify oil-supply and -discharge structure of balance pistons, can balance with stable thrust force regardless of changes in compressed gas pressure, can perform secured shaft sealing with compression operating space and bearing space, enables accurate adjustment of clearance of discharge end plane between the rotor end plane and casing end wall, and aims to

provide a reasonable and high-performance thrust force balancing device." (page 4, lines 17 through page 5, line 4).

(B) "In addition, the spacer 16 that consists of the large-diameter part 14 and the small-diameter part 15 that have labyrinth grooves on the outer periphery fit between the bearing 12 on the male rotor 3 side and the end plane 21 of the rotor and it maintains the discharge end plane clearance between the rotor and the discharge casing 9. In addition, both the aforementioned large-diameter part 14 and small-diameter part 15 are inserted by sealing and sliding freely into the shaft seal hole 17 that consists of a large-diameter hole and small-diameter hole that are formed on the end wall 22 of the discharge casing 9, and the operating room 19 that is formed between the step 18 that is at the border of the large-diameter part 14 and the small-diameter part 15 of the aforementioned spacer and the aforementioned shaft sealing hole 17 communicate with the oil groove 26 of the shaft sealing collar 25 that fits the female rotor 4 via the communication hole 20. The oil groove 26 is formed on the periphery, substantially at the center of the aforementioned shaft sealing collar; it communicates with the oil supply hole 27 that is drilled in the discharge casing 9; and it is connected to the oil pool 30 in the separator tank 29 via the pipe 28." (page 6, line 12 through page 7, line 8)

(C) "When the compressor is operated, gas that is suctioned from the suction inlet 45 is compressed by the engagement of the male and female rotors 3 and 4, discharged from the discharge outlet 46, and pumped into the separator tank 29 via a discharge pipe, which is not shown in the figure.

As a result, lubrication oil in the oil pool 30 is discharged by the aforementioned compressed gas pressure and pumped into the operating room 19 of the spacer 16 that is installed on the male rotor 3, via the oil groove 26 that is formed on the periphery of the shaft sealing collar 25 of the female rotor 4 via the pipe 28 and the oil supply hole 27.

Therefore, thrust load in direction A in the figure that is proportional to compressed gas pressure always affects the male rotor 3.

On the other hand, by the act of compression in association with the aforementioned engagement and rotation of the male and female rotors, radial load as an adverse force of compressed gas and thrust load in direction B in the figure affect both rotors; however, the thrust force in direction A in the figure that affects the spacer 16 with oil pressure in the aforementioned operating room 19 offsets the thrust load on the male rotor side and reduces the thrust load that is applied to the bearing 12.

In other words, the thrust load in the aforementioned directions A and B always affects with the force that is proportional to the compressed gas pressure. Therefore, a balanced proportion is always maintained regardless of the changes in the aforementioned

compressed gas pressure." (page 7, line 12 through page 8, line 16).

B. Matters that are understood based on the statements in Exhibit Ko 5

According to statements in A. (B), (C) above and Figure 1, it can be understood that oil is separated and collected from compressed gas that is discharged with oil, the oil is accumulated temporarily in the oil pool that is at the bottom of the compressor, and the oil separator tank 29 that sends compressed gas from which oil is separated is connected to the outlet pipe; and it connects the pipe 28 that guides the oil in the oil pool 30 without pressurizing it into the operating room 19 on the suction side that faces the spacer 16.

C. Technical matters stated in Exhibit Ko 5

According to the matters stated in Exhibit Ko 5 (A. above) and the matters that can be understood based on the statements in Exhibit Ko 5 (B. above), it is found that the following technical matters are stated in Exhibit Ko 5.

"A screw compressor that separates and collects oil from compressed gas that is discharged with oil, accumulates oil in the oil pool 30 at the bottom temporarily, connects the separator tank 29 that sends compressed gas from which oil is separated to a discharge pipe, and connects the pipe 28 that guides the oil in the oil pool 30 without pressurizing it into the operating room 19 on the suction side that faces the spacer 16, which functions as a balance piston."

2. Grounds for Rescission 1 (Error in the determination concerning inventive step related to Grounds for Invalidation 1)

(1) Difference 2 (partition wall to block pressure)

A. This court judged that it is not unreasonable for the Defendant to allege errors in the determination on Difference 2 in the JPO Decision; however, there are no errors in the determination of the JPO Decision to the effect that Difference 2 is not a substantive difference. The grounds are as stated below.

B. Whether it is appropriate that the Defendant alleged errors in the determination of the JPO Decision related to Difference 2

The Plaintiff alleged that the allegation of the Defendant stating that there are errors in the determination on Difference 2 is unreasonable.

However, the Defendant challenged the Plaintiff's allegation that there are errors in the determination of the JPO Decision to the effect that a person skilled in the art could have easily invented the Patented Invention by applying well-known art that is indicated in Exhibits Ko 2 through Ko 5 to Exhibit Ko 1 Invention, and the Defendant alleged as the grounds for the aforementioned challenge as follows: Difference 2 between Exhibit Ko 1 Invention and the Patented Invention is a substantive difference; a person skilled in the art could not have easily conceived of the composition of the Patented Invention

related to Difference 2; and a person skilled in the art could not have easily invented the Patented Invention. This allegation was made also in the Trial for Invalidation. Therefore, the aforementioned allegation of the Defendant does not bring new matters that were not subject to examination and determination in the trial for invalidation and it serves as the basis for the existence of inventive step of the Patented Invention. Therefore, it cannot be said to be unreasonable in itself. Consequently, the aforementioned allegation of the Plaintiff cannot be adopted.

C. Whether there are errors in the determination of the JPO Decision on Difference 2

(A) Technical meaning of a partition wall to block pressure in the Patented Invention

a. Statement in the Description

There are the following statements in the detailed explanation of the invention of the Description.

(a) "[0001]

[Technical field of the invention]

The present invention relates to an oil-cooled screw compressor that is designed to reduce thrust force which affects the screw rotor."

(b) "[0013]

[Embodiment of the invention]

Next, an embodiment of this invention is explained in accordance with drawings. Figures 1 through 3 show a screw compressor related to the first embodiment of the first invention and an explanation of common parts with the screw compressors indicated in Figures 6 and 7 is omitted by providing identical numbers.

This compressor is provided with a pressure-equalizing flow channel 8 that is branched off from the oil supply flow channel 7 on the primary side of the oil pump 6, wherein the part of the oil supply flow channel 7 that is connected to the secondary side of the oil pump 6 is guided to the parts of the radial bearings 13 and 14 and the pressure-equalizing flow channel 8 is guided to the part of the balance piston 17. For details of the structure in the compressor body 3, as shown in figures 2 and 3, the radial bearing 14, the thrust bearing 16, and the balance piston 17 are installed on the rotor shaft on the discharge side of the compressor body 3 in order from the screw rotor 11 and 12 sides, and the partition wall 31 is installed between the thrust bearing 16 and the balance piston 17. The partition wall 31 has the shaft sealing means 32 in the inner periphery, blocks pressure between space A that contains the thrust bearing 16 and space B that contains the balance piston 17, and separates space B from the input shaft 15, the thrust bearing 16, the radial bearings 13 and 14, and other constituent features.

[0014]

The partition wall 31 guides suction pressure P_s into space A and introduces discharge pressure P_d by the pressure-equalizing flow channel 8 into the plane on the thrust bearing 16 side of the balance piston 17 in Space B.

As mentioned above, since the input shaft 15 is placed on the suction side, the diameter of the thrust bearing part is not affected by the diameter of the radial bearing 14 or the input shaft 15 and the load capacity can be increased by decreasing the inner diameter of the thrust bearing 16. In addition, space B is separated from other constituent features and therefore the shaft diameter and outer diameter of the balance piston 17 can be determined regardless of other constituent features.

Force F, which affects the balance piston 17, is shown in the following formula.

$F = (D^2 - d^2) \times (\pi/4) \times P_d$

In this formula, D refers to the outer diameter of the balance piston 17 and d refers to the shaft diameter of the balance piston 17. Therefore, in order to fully reduce thrust force, it is only necessary to increase Force F. For this reason, it is required to increase $(D^2 - d^2)$ to secure the necessary pressure receiving area of the balance piston 17. In other words, it is only necessary to increase outer diameter D and decrease shaft diameter d of the balance piston 17."

b. Technical meaning of partition wall to block pressure

According to the statement in the Description in the aforementioned a. (a), the Patented Invention is based on "reducing thrust force that affects the screw rotor." In reference to the statement of the aforementioned a. (b) and Figure 3 of the Description, "partition wall" in the Patented Invention refers to a substance that blocks pressure between space A and space B by placing it between Space B into which discharge pressure P_d is introduced and space A into which suction pressure is introduced, in order to have discharge pressure P_d affect the balance piston 17 so that it fully reduces thrust force.

Then, it is construed that the sealing performance of the "partition wall" requires blocking the leakage of oil from space B to space A to the extent that discharge pressure P_d can affect the balance piston 17 to "reduce the thrust force that affects the screw rotor," which is the basis of the Patented Invention, but does not require sealing performance where no oil leakage is allowed at all.

(B) Parts 7, 5, and 4 in Exhibit Ko 1 Invention

a. Placement of parts

In reference to Figure 3 of Exhibit Ko 1, as shown in the attached drawing (colored drawing shown on page 23 of the JPO Decision), it can be understood that the parts 7, 5, and 4 are placed in order from the right between the thrust piston room 60 and the angular contact ball bearing 56 and the part 6 is placed at their bottom.

b. Existence of pressure difference

In Exhibit Ko 1 Invention, pressurized liquid, such as compressor injection liquid, is guided into the thrust piston room 60 and the pressure affects the piston 62 and reduces thrust force.

When considering the space where the angular contact ball bearing 56 is placed, Exhibit Ko 1 states that liquid is distributed to the compressor bearing; in concrete terms, it is stated that liquid is supplied to the bearings 52 and 54; however, there is no concrete statement concerning the supply of liquid to the angular contact ball bearing 56. It is a common practice to lubricate ball bearings with oil, but it is normally unlikely to think in this way since if the space where the ball bearing is located is completely filled with high-pressure oil, it inhibits the smooth rolling motion of the balls. Then, in Exhibit Ko 1 Invention, it is found that the space where the Angular Contact Ball Bearing 56 is placed is not completely filled with liquid that is pressurized with the pump 140 and the space is in gas-liquid mixing conditions at most; pressure is lower than in the thrust piston room 60; and there is a pressure difference between the space where the angular contact ball bearing 56 is placed and the thrust piston room 60.

c. Degree of sealing performance

According to the description of Figure 3 of Exhibit Ko 1, it can be understood that a hole that penetrates the part 5 and the part 7 is formed in these parts and this through hole is open to the right end plane of the part 4. In addition, in consideration of common general technical knowledge, the part 3 and the part 4 in Figure 3 of Exhibit Ko 1 are parts to secure the outer ring of the angular contact ball bearing 56 non-rotatably and push pressure of the part 5 affects the outer ring of the angular contact ball bearing 56 via the part 4. Therefore, it is understood that the distance between the part 5 and the part 4 becomes considerably close; however, sealing parts are not seen at the through hole of the part 5 and the right end plane of the part 4 and the space where the angular contact ball bearing 56 is placed is low-pressure as mentioned above. Therefore, it cannot be said that there is no possibility that liquid supplied to the thrust piston room 60 leaks out into the space where the angular contact ball bearing 56 is placed from between the part 5 and the part 4 via the aforementioned through hole.

However, as examined in (A) b. above, the sealing performance of the "partition wall" in the Patented Invention can hinder leakage of oil from Space B to Space A to the extent that sufficient pressure to balance the arising adverse thrust load can affect the Balance Piston 17, but sealing performance where no oil leakage is allowed at all is not required. Moreover, since there is a statement in Exhibit Ko 1 that "pressurized liquid, such as compressor injection liquid, is guided into the room 60 and offsets the force in the thrust

direction by high-pressure gas that affects the end plane 64 of the rotor 12 by affecting the piston 62" (Column 6, line 22 through line 25). Therefore, in Exhibit Ko 1 Invention, it can be construed that the parts 7, 5, and 4 block the pressure between the thrust piston room 60 and the space where the angular contact ball bearing 56 is placed to the extent of offsetting the force in the thrust direction that affects the thrust piston 62 with pressure in the thrust piston 60 as a whole.

d. Whether the parts 7, 5, and 4 fall under the partition wall to block pressure

In Exhibit Ko 1 Invention, the parts 7, 5, and 4 are placed between the thrust piston room 60 and the space where the angular contact ball bearing 56 is placed, where there is pressure difference, and thereby they block these spaces. Therefore, it is recognized that the parts 7, 5, and 4 have the function of a "partition wall to block pressure" in the Patented Invention.

(C) Whether there are errors in the determination of the JPO Decision

According to the above, Exhibit Ko 1 Invention has parts equivalent to a " partition wall to block pressure" of the Patented Invention. Therefore, Difference 2 is not a substantive difference between Exhibit Ko 1 Invention and the Patented Invention and there are no errors in the determination of the JPO Decision which has the same effect.

(D) Examination of allegation of the Defendant

a. The Defendant alleged that in Exhibit Ko 1 Invention, it is necessary to continue supplying liquid (oil before cooling bearing) to the angular contact ball bearing 56 from the thrust piston room 60; for this reason, concerning the parts 7, 5, and 4 that intervene between the angular contact ball bearing 56 and the thrust piston room 60, the parts 7 and 5 have through holes and the through holes communicate mutually; the part 4 spatially communicates with the area where the angular contact ball bearing 56 is placed, via the inner space; and therefore, it is impossible to say that the parts 7, 5, and 4 are partition walls to block pressure (No. 3, 1. (2) A. (B) b. above).

However, as mentioned in (B) c. above, the "partition wall" of the Patented Invention does not require sealing performance to the extent that no oil can leak out and the parts 7, 5, and 4 of Exhibit Ko 1 Invention block pressure between the thrust piston room 60 and the space where the angular contact ball bearing 56 is placed to the extent of offsetting the force in the thrust direction that affects the thrust piston 62 with the pressure in the thrust piston room 60 as a whole. Therefore, it is found that the parts 7, 5, and 4 fall under the partition wall to block pressure and the aforementioned allegation of the Defendant cannot be adopted.

b. The Defendant alleged that, in Exhibit Ko 1 Invention, in order for the thrust piston 62 to receive a supply of liquid "for which liquid pressure is increased" "fully" with the pump

140 and to achieve the function to "offset the force in the thrust direction with high-pressure gas that affects the end plane 64 of the rotor 12," it is necessary that pressure that affects the rotor side of the thrust piston 62, which is the pressure in the thrust piston room 60, is higher than the pressure that affects the opposite rotor side of the thrust piston 62, which is the pressure in the room 174; and even if the parts 7, 5, and 4 are not parts corresponding to "partition wall to block pressure," since the thrust piston room 60 has higher pressure than the room 174, the aforementioned function is achieved (No. 3, 1. (2) A. (B) b. above).

However, the parts 7, 5, and 4 exist between the thrust piston room 60 and the space where the angular contact ball bearing 56 is placed. Therefore, if there is a pressure difference between the thrust piston room 60 and the space where the angular contact ball bearing 56 is placed, it is found that the parts 7, 5, and 4 fall under the partition wall to block pressure regardless of pressure in the room 174. In addition, the intention of the Defendant's allegation is construed that if there is a pressure difference between the thrust piston room 60 and the room 174, even though the parts 7, 5, and 4 that have through holes are not designed to "block pressure," the thrust piston 62 is pressed into the side of the room 174 by the pressure difference. However, it is construed that in order for the force to press the thrust piston 62 into the side of the room 174 to work, it is necessary for the pressure in the thrust piston room 60 to increase and, for this purpose, the parts 7, 5, and 4 need to block pressure, in other words, they need to be a "partition wall to block pressure." Consequently, the aforementioned allegation of the Defendant cannot be adopted.

(2) Difference 3 (non-pressurized flow channel)

A. This court ruled that a person skilled in the art could have easily conceived of applying well-known art that is stated in Exhibits Ko 2 through Ko 5 to Exhibit Ko 1 Invention, supplying oil into the piston room of the balance piston without pressurizing it with a pump by means of installing a route that does not go through the pressuring pump 140 and the space 134 (means 1), and adopting the composition of the Patented Invention related to Difference 3, and therefore there were errors in the determination of the JPO Decision on Difference 3. The grounds are as stated below.

B. Technical problem of occurrence of adverse thrust force (adverse thrust load conditions)

The technical matters stated in Exhibit Ko 2 are as indicated in 1. (2) C. above. Exhibit Ko 2 presents a technical problem that adverse thrust force (adverse thrust load conditions) occurs: "concerning the existing screw compressors that supply pressurized oil for lubrication, cooling, and sealing that is pressurized by the oil pump into a balance

piston as operating oil, it has a problem in particular at start-up where high-pressure oil that is discharged by an oil pump is applied to the balance piston before the pressure difference between the suction side and the discharge side of the compressor becomes high, and therefore, the rotor is pushed to the discharge side and excess stress is applied to the thrust bearing and the thrust bearing holding plate, etc."

Exhibit Ko 1 Invention is a liquid jet screw compressor that is formed by installing a route to guide liquid that is separated from high-pressure gas, cooled, and recycled to the compressor into the thrust piston room 60 via the pump 140. Since there are no circumstances to support that adverse thrust force will not be generated, it is found that Exhibit Ko 1 Invention has a technical problem of the occurrence of adverse thrust force (adverse thrust load conditions).

C. Well-known art related to installing a non-pressurized flow channel

(A) Technical matters stated in Exhibit Ko 2 are as indicated in 1. (2) C. above and it is "formed by installing the pipe 58 that guides the oil in the oil separator 52 into the balance piston room 34 that faces the balance piston 32 without pressurizing it."

Technical matters stated in Exhibit Ko 3 are as indicated in 1. (3) C. above and it is "an oil-cooled screw compressor 1 that is formed by installing the pipe 6 and the branch pipe 7 that guide the oil in the oil pool into the first pressure surface 12 side of the balance piston 11 of the cylinder 14 without pressurizing it."

Technical matters stated in Exhibit Ko 4 are as indicated in 1. (4) B. above and it is "an oil injection screw compressor that is formed by installing the oil inlet hole 22 to guide oil with the pressure that corresponds to the outlet pressure of a screw compressor, which is decreased by a decrease in pressure, into the pressurized space 21 that faces the balance piston 19."

Technical matters stated in Exhibit Ko 5 are as indicated in 1. (5) C. above and it is "a screw compressor where the Pipe 28 that guides the oil in the oil pool 30 into the operating room 19 on the suction side that faces the spacer 16, which functions as a balance piston, without pressurizing it is connected."

(B) As mentioned in (A) above, it is found that Exhibits Ko 2 through Ko 5 state that pipes that guide oil collected from a compressor into the space where pressure is applied to the balance piston without pressurizing it are installed in a screw compressor and that it was a well-known technical matter before the filing date of the Patent Application.

D. Whether the Patented Invention is easily conceived of by a person skilled in the art

Exhibit Ko 1 Invention has a technical problem of occurrence of adverse thrust force (adverse thrust load condition) (B. above). Installing a pipe to guide oil that is collected from a compressor into the space where pressure is applied to the balance piston without

pressurizing it was a well-known technical matter before the filing date of the Patent Application (C. (B) above). Therefore, it is found that a person skilled in the art could have easily conceived of designing a route that guides liquid into a thrust piston room as a non-pressurized route, by applying the aforementioned well-known technical matters in order to resolve the aforementioned problem of Exhibit Ko 1 Invention.

E. Examination of the allegations of the parties in this case

(A) Making a determination regarding whether to adopt a concrete composition based on the relevant composition

The JPO made a determination on Exhibit Ko 1 Invention that, as examples of a composition to guide liquid (oil) into the Thrust Piston Room 60 without pressurizing it as indicated in Difference 3, [i] a means to install a route that does not go through the pressurizing pump 140 and the space 134 (Means 1) and [ii] a means not to adopt the pressurizing pump 140, but to supply liquid into the space 134 without pressurizing it (means 2) can be considered. Then, the JPO stated that these means are a disincentive when applying them to Exhibit Ko 1 Invention, and found an inventive step. Regarding this fact, the Plaintiff alleged that since the composition that forms the non-pressurized flow channel is only a circumstance outside the constituent features, there are errors in the JPO Decision that determined that it is a disincentive to adopt an example of a specific composition by focusing on the specific composition alone out of concrete compositions to form the non-pressurized route (No. 3, 1. (1) B. (B) a. above).

However, in order to guide liquid (oil) into the thrust piston room 60 without pressurizing it such as in the composition of the Patented Invention related to Difference 3, on the assumption that the screw compressor has the space 134, it can be considered that either of the following compositions is adopted: [i] means to install a route that does not go through the pressurizing pump 140 and the space 134 in the composition with the pressurizing pump 140 (means 1) and [ii] means not to adopt the pressurizing pump 140 and to supply liquid into the space 134 without pressurizing it (means 2). The JPO Decision examined these two possible compositions, and did not make a determination as to whether it could have been easily conceived of by a person skilled in the art by specifying and limiting to any concrete compositions other than these means. Therefore, there are no errors in the examination method of the JPO Decision and the allegation of the Plaintiff concerning this point cannot be adopted.

(B) Adopting the means to install a route that does not go through the pressurizing pump 140 and the space 134 (means 1) and the technical idea of Exhibit Ko 1 Invention

a. Aggregation of liquid into the Space 134

The Defendant alleged the following: Exhibit Ko 1 defines that Exhibit Ko 1

Invention adopted a composition as a "modified liquid distribution mechanism" that pressurizes liquid with the pump 140, aggregates the pressurized liquid into the space 134 temporarily, and supplies the liquid to "all necessary points in the compressor" (including the thrust piston room 60); there are no points in the "modified liquid distribution mechanism" of Exhibit Ko 1 Invention where liquid that is pressurized with the pump 140 is supplied without going through the space 134 that is formed in the intermediate housing 30; and therefore, a composition to supply liquid that is not pressurized with the pump 140, into the thrust piston room 60 alone without going through the space 134 is against the technical idea of Exhibit Ko 1 Invention and the application of such idea is excluded (No. 3, 1. (2) B. (B) c. (a) above).

Exhibit Ko 1 states the following concerning the Space 134: "The intermediate housing 30 also has a space or the manifold 134 to distribute pressurized liquid." (Column 9, line 35 through line 37); "The space 134 functions as an operating room that is formed by compressor bearing, seal, thrust piston, and the crossing holes 18 and 20, and as a manifold to distribute pressurized liquid into the room 70 of the driver for the capacity control valve 42. Pressurized liquid is supplied from the space 134 to the room 70 via the pipes 148 and 150, the route 152, and the pipe 154." (Column 10, line 6 through line 13). Concerning the supply of liquid that is pressurized with the pump 140, it only states to adopt a composition where the liquid is aggregated into the space 134 temporarily and then is supplied to "all necessary points in the compressor" (including the thrust piston room 60). Then, even if there is room to consider that changing part of the route to supply liquid that is pressurized with the Pump 140 and daring to install another route that does not go through the space 134 is against the technical idea of Exhibit Ko 1 and therefore the application of such idea is excluded, it cannot be construed that when installing a non-pressurized route that supplies liquid that is not pressurized with a pump into the thrust piston room 60, Exhibit Ko 1 excludes the idea of installing a route that does not go through the pump 140 and the space 134. Consequently, the aforementioned allegation of the Defendant cannot be adopted.

b. Prevention of leakage outside the compressor

The Defendant pointed out that Exhibit Ko 1 Invention is to equip a "modified liquid distribution mechanism" that is composed of the space 134 in the intermediate housing 30, the pump 140 and other units and to equip a case with the minimum number of housing joints in order to resolve the problem of leakage of gas and liquid outside the compressor. Then, the Defendant alleged as follows: in order to decrease leakage of gas and liquid outside the compressor, it is necessary or helpful to decrease leakage of gas and liquid by also modifying the liquid distribution mechanism inside the housing; in Exhibit Ko 1

Invention, a composition to install a non-pressurized route as a route that guides liquid into the thrust piston room, for example, to branch the pipe 138, increase the number of pipes, and connect the pipes to the pipe 172, is significantly unreasonable for a "modified liquid distribution mechanism" of Exhibit Ko 1 Invention; and adopting such composition is against the technical idea of Exhibit Ko 1 Invention (No. 3, 1. (2) B. (B) c. (b) above).

However, for example, even if inside the case is composed by installing a branch on the pipe 138 that reaches to the pump 140 and connecting it to the thrust piston room 60 in order to install a non-pressurized route to supply liquid that is not pressurized into a thrust piston room, it is not found that this composition necessarily increases the leakage of gas and liquid outside the compressor. For this reason, even if Exhibit Ko 1 Invention is to resolve the problem of the leakage of gas and liquid outside the compressor, it is not found that installing the aforementioned non-pressurized route is a significantly unreasonable composition for a "modified liquid distribution mechanism" of Exhibit Ko 1 Invention and it cannot be said that adopting such composition is against the technical idea of Exhibit Ko 1 Invention. Consequently, the aforementioned allegation of the Defendant cannot be adopted.

(C) Disincentive for adopting the means to install a route that does not go through the pressurizing pump 140 and the space 134 (means 1) for Exhibit Ko 1 Invention

a. Functional failure of the compressor 10 where liquid is not supplied to the thrust piston 62 and the angular contact ball bearing 56

The Defendant alleged as follows: the pump 140 should increase liquid pressure to the extent sufficient for providing appropriate force to the thrust piston 62; if a route to guide liquid into the thrust piston room 60 is changed to a non-pressurized route in Exhibit Ko 1 Invention, the pump 140 cannot "increase" "liquid pressure" "sufficiently" and it cannot provide "appropriate force" to the thrust piston 62; and therefore, resistance against the thrust load of the thrust piston 62 becomes incompetent and the compressor 10 breaks down. The Defendant also alleged that it becomes impossible to continue supplying liquid into the angular contact ball bearing 56 via the thrust piston room 60 and through holes of the parts 7 and 5, temperature of the angular contact ball bearing 56 increases over the permissible temperature and the angular contact ball bearing 56 is damaged, and therefore the Compressor 10 breaks down (No. 3, 1. (2), B, (B) d, (a) above).

However, Exhibits Ko 2 through Ko 5 state that pipes that guide oil that is collected from a compressor into the space where pressure is applied to the balance piston, without pressurizing it are installed in a screw compressor. It is a well-known technical matter before the filing date of the Patent Application (C. (B) above). Therefore, it is found that the screw compressor that provides necessary force to balance thrust force into the

balance piston (thrust piston) by non-pressurized oil (liquid) was well-known before the filing date of the Patent Application. In addition, it is not clear in Exhibit Ko 1 Invention how liquid is supplied into the angular contact ball bearing 56 and it cannot be construed unambiguously that liquid is supplied from the thrust piston room 60 vial through holes of the parts 7 and 5. Even if liquid is supplied in that way, there is no evidence to support immediately that changing liquid that is supplied into the thrust piston room 6 to non-pressurized liquid causes a shortfall in the supply into the angular contact ball bearing 56. In light of the above, it cannot be found that the compressor 10 breaks down if the route to guide liquid into the thrust piston room 60 is changed to a non-pressurized one and the aforementioned allegation of the Defendant cannot be adopted.

b. Functional failure of the compressor 10 due to not going through the filter 146

The Defendant alleged as follows: if a route not going through the pressurizing pump 140 and the space 134 is installed, it means that liquid that is supplied into the thrust piston room 60 goes around the filter 146; therefore, foreign substances (scrap metal and iron powder generated due to contact of rotors, and other impurities generated from the chemical reaction of liquid, etc.) will reach the thrust piston room 60 and generate clogs and other inconveniences; and eventually the compressor 10 results in functional failure; in Exhibit Ko 1 Invention, when attempting to modify the composition to supply liquid into the thrust piston room 60 to the composition where liquid reaches the thrust piston room 60 by going through other filters although it goes around the pump 140, the filter 146, and the space 134, filters other than the filter 146 need to be added and liquid pipes and liquid pipe joints corresponding to them also need to be added; therefore, it is against the intention, etc. of Exhibit Ko 1 Invention to minimize the number of liquid pipe joints outside the compressor, and adopting such composition is a disincentive (No. 3, 1. (2) B. (B) d. (b) above).

However, even if the liquid that is supplied into the thrust piston room 60 goes around the filter 146, most of the foreign substances are removed by going through the filter 146 eventually while the circulation of liquid in the entire compressor is repeated and, if necessary, it is possible to take measures to change the composition where liquid goes through a filter before the pump so that both liquid that is pressurized with a pump and liquid that is not pressurized with a pump go through the filter. Therefore, it is not found that the compressor 10 breaks down. in addition, if the composition is changed as mentioned above, there is no evidence to support that the change increases the number of liquid pipe joints outside the compressor significantly. Consequently, the aforementioned allegation of the Defendant cannot be adopted.

c. Motivation to install a non-pressurized route

The Defendant alleged that Exhibit Ko 1 has no statements or suggestions concerning the technical problem of occurrence of adverse thrust force (adverse thrust load condition) and Exhibit Ko 1 Invention has no motivation to install a non-pressurized route to resolve the adverse thrust load (No. 3, 1. (2) B. (B) d. (c) above).

It is stated in Column 10, line 24 through line 26 of Exhibit Ko 1 that "the pressure reduction valve 164 controls liquid pressure in the space 134" and therefore it is construed that the purpose of installing the pressure reduction valve 164 is to prevent an excess increase in pressure in the space 134, but not to resolve the adverse thrust load condition. As mentioned in B. above, Exhibit Ko 2 presented the technical problem that adverse thrust force (adverse thrust load conditions) occurs: "concerning the existing screw compressors that supply pressurized oil for lubrication, cooling, and sealing that is pressurized by the oil pump into a balance piston as operating oil, it has a problem in particular at start-up where high-pressure oil that is discharged by an oil pump is applied to the balance piston before the pressure difference between the suction side and the discharge side of the compressor becomes high, and therefore, the rotor is pushed to the discharge side and excess stress is applied to the thrust bearing and the thrust bearing holding plate, etc." In consideration of the developmental mechanism of the aforementioned adverse thrust force (adverse thrust load condition), it is found that a person skilled in the art could have recognized that the problem of the occurrence of adverse thrust force (adverse thrust load condition) is not unique to a screw compressor with a special composition, but it occurs generally with screw compressors and that it also occurs with the screw compressor of Exhibit Ko 1 Invention. As mentioned above, the problem of the occurrence of adverse thrust force (adverse thrust load condition) can also be recognized with Exhibit Ko 1 Invention. Therefore, it is found that there is a motivation to install a non-pressurized route to resolve adverse thrust load in order to resolve the problem. Based on the above, even if there is no direct statement in Exhibit Ko 1 concerning the technical problem of occurrence of adverse thrust force (adverse thrust load condition) and resolution thereof, it is found that the motivation to install a non-pressurized route arises with Exhibit Ko 1 Invention in order to resolve the problem. Consequently, the aforementioned allegation of the Defendant cannot be adopted.

3. Based on the above, it is found that the Patented Invention could have been easily conceived of by a person skilled in the art by applying the well-known art as stated in Exhibits Ko 2 through Ko 5 to Exhibit Ko 1 Invention; accordingly, it cannot obtain a patent pursuant to the provisions of Article 29, paragraph (2) of the Patent Act; the Patent should be invalidated pursuant to the provisions of Article 123, paragraph (1), item (ii) of the Patent Act. The Grounds for Rescission 1 (error in the determination concerning

inventive step related to Grounds for Invalidation 1) are well-founded.

Consequently, the JPO Decision shall be rescinded and the judgment is rendered as indicated in the main text.

Intellectual Property High Court, Third Division

Presiding judge: TSURUOKA Toshihiko

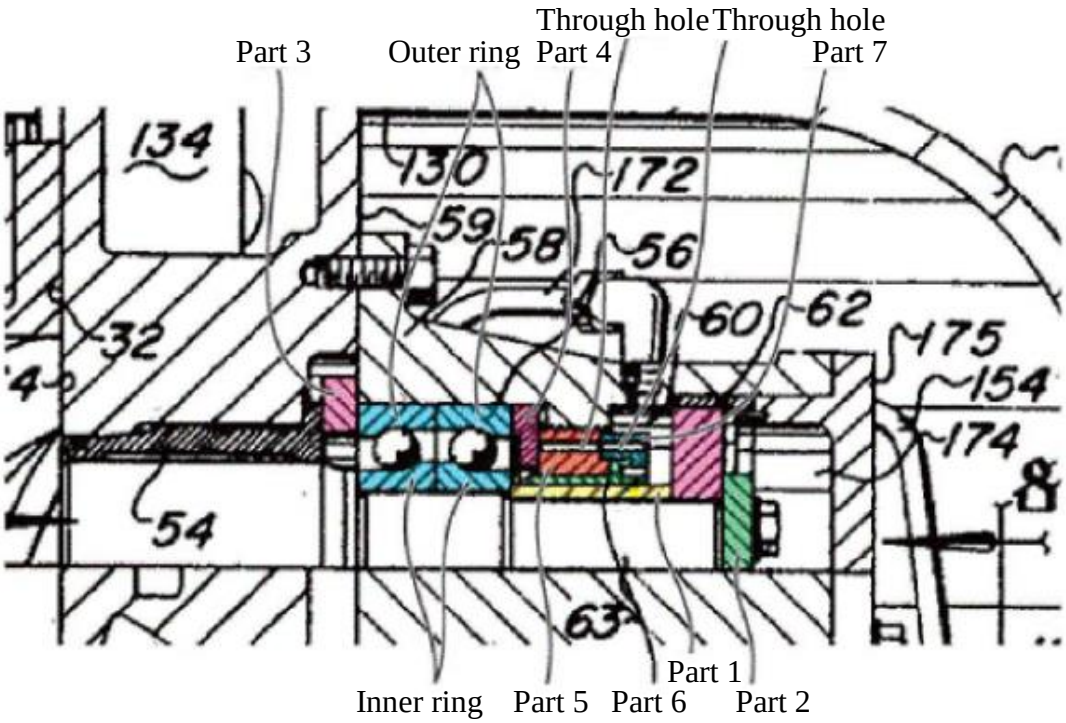
Judge: UEDA Takuya

Judge: NAKADAIRA Ken

Attachment

Drawing

(Colored drawing shown on page 23 of the JPO Decision)



Copy of the attached written decision
(omitted)

Attachment
(omitted)