Trial decision

Invalidation No. 2010-800162

Kanagawa, Japan
Demandant AMADA COMPANY LIMITED

Tokyo, Japan
Patent Attorney MIYOSHI, Hidekazu

Tokyo, Japan
Patent Attorney TOYOOKA, Shizuo

Tokyo, Japan
Patent Attorney SAKURAI, Yoshihiro

Tokyo, Japan
Attorney SUEYOSHI, Wataru

Tokyo, Japan
Attorney TAKAHASHI, Motohiro

Tokyo, Japan
Demandee MITSUBISHI DENKI KABUSHIKI KAISHA

Tokyo, Japan
Attorney KONDO,Keiji

Tokyo, Japan
Patent Attorney NAKATSURU, Kazutaka

Tokyo, Japan
Patent Attorney UCHIKI, Tatsuya

Tokyo, Japan
Patent Attorney NAKANE, Takayuki

The case of trial regarding the invalidation of Japanese Patent No. 3138613, entitled "LASER MACHINIG APPARATUS," between the parties above has resulted in the following trial decision.

Conclusion

The correction shall be approved.

The patent regarding the invention according to Claim 1 of Japanese Patent No. 3138613 was invalidated.

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

Reason

No. 1 History of the procedures

The application of the case was filed on May 24, 1995, the establishment of the patent right relating to the invention according to Claims 1 to 7 was registered on December 8, 2000 (Japanese Patent No. 3138613), after that, the opposition to the patent was submitted (Opposition No. 2001-72301), and a decision on the opposition, "The correction shall be approved. The patent according to Claims 1 to 3 and 5 of Japanese Patent No. 3138613 is maintained," was made as of February 20, 2002, and the above decision has become final and binding.

The demandant requested a trail for invalidation on September 14, 2010 to invalidate the patent regarding the invention according to Claim 1. The demandee submitted a written reply and made a correction request on December 7, 2010. Both parties submitted oral proceedings statement briefs on February 16, 2011. Oral proceeding was held on March 2, 2011.

No. 2 Suitability of the correction

1. Details of the correction

The correction request as of December 7, 2010 is to request correction of the description (hereinafter referred to as "Patent description") attached to the application of the patent in accordance with the corrected description attached to the written correction request. The details thereof are as follows with underlined corrected points.

(1) Correction A

Regarding Claim 1 of the scope of claims in the Patent invention,

" [Claim 1] A laser machining apparatus for cutting/welding a work by collecting a laser beam output from a laser oscillator by means of a converging optical member comprising: a laser beam reflecting member which is arranged in a transmission path of the laser beam and elastically deforms with a fluid pressure; a reflecting member supporting section supporting the peripheral section of the laser beam reflecting member and, together with the laser beam reflecting member, forming a space on an opposite side of a laser beam reflecting surface; fluid supply means for supplying a gas into the space in the reflecting member supporting section; a solenoid valve for switching fluid supply pressure in stages or an electropneumatic valve for switching fluid supply pressure successively; and fluid discharge means for discharging the gas from the space in the reflecting member supporting section, wherein the space, except for a fluid feed path and a fluid discharge path distinct from the fluid feed path, is sealed; and wherein a fluid pressure required for elastically deforming the laser beam reflecting member is applied to the opposite side of the laser beam reflecting surface" is corrected to

" [Claim 1] A laser machining apparatus for cutting/welding a work by collecting a laser beam output from a laser oscillator by means of a converging optical member comprising: a laser beam reflecting member which is arranged in a transmission path of the laser beam and elastically deforms with a fluid pressure; a reflecting member

supporting section supporting the peripheral section of the laser beam reflecting member and, together with the laser beam reflecting member, forming a space on an opposite side of a laser beam reflecting surface; fluid supply means for supplying a gas into the space in the reflecting member supporting section; an electropneumatic valve for switching fluid supply pressure successively; and fluid discharge means for discharging the gas from the space in the reflecting member supporting section, wherein the space, except for a fluid feed path and a fluid discharge path distinct from the fluid feed path, is sealed; and wherein a fluid pressure required for elastically deforming the laser beam reflecting member is applied to the opposite side of the laser beam reflecting surface."

(2) Correction B

Regarding paragraph [0006] in the detailed description in the Patent description,

" [0006]

[Means for solving the problem]

The laser machining apparatus according to the present invention for cutting/welding a work by collecting a laser beam output from a laser oscillator by means of a converging optical member comprises: a laser beam reflecting member which is arranged in a transmission path of the laser beam and elastically deforms with a fluid pressure; a reflecting member supporting section supporting the peripheral section of the laser beam reflecting member and, together with the laser beam reflecting member, forming a space on an opposite side of a laser beam reflecting surface; fluid supply means for supplying a gas into the space in the reflecting member supporting section; a solenoid valve for switching fluid supply pressure in stages or an electropneumatic valve for switching fluid supply pressure successively; and fluid discharge means for discharging the gas from the space in the reflecting member supporting section, wherein the space, except for a fluid feed path and a fluid discharge path distinct from the fluid feed path, is sealed; and wherein a fluid pressure required for elastically deforming the laser beam reflecting member is applied to the opposite side of the laser beam reflecting surface" is corrected to

" [0006]

[Means for solving the problem]

The laser machining apparatus according to the present invention for cutting/welding a work by collecting a laser beam output from a laser oscillator by means of a converging optical member comprises: a laser beam reflecting member which is arranged in a transmission path of the laser beam and elastically deforms with a fluid pressure; a reflecting member supporting section supporting the peripheral section of the laser beam reflecting member and, together with the laser beam reflecting member, forming a space on an opposite surface of a laser beam reflecting surface; fluid supply means for supplying a gas into the space in the reflecting member supporting section; an electropneumatic valve for switching fluid supply pressure successively; and fluid discharge means for discharging the gas from the space in the reflecting member supporting section, wherein the space, except for a fluid feed path and a fluid discharge path distinct from the fluid feed path, is sealed; and wherein a fluid pressure required for elastically deforming the laser beam reflecting member is applied to the opposite

surface of the laser beam reflecting surface."

2. Suitability of the purpose for the correction, existence or absence of new matter, and enlargement or alteration
(1) Correction A

Correction A, which deletes the matter, "solenoid valve for switching in stages or," in the selective matters specified invention, "a solenoid valve for switching fluid supply pressure in stages or an electropneumatic valve for switching fluid supply pressure successively," in Claim 1 to be corrected to "an electropneumatic valve for switching fluid supply pressure successively" for limitation, is obviously intended for restriction of the scope of claims.

In view of the description in [0028] of the Patent description, "As shown in FIG. 2, 35 is an electropneumatic valve for smoothly changing the pressure of the air supplied.", the correction is made within the matters described in the Patent description.

Furthermore, it is obvious that the correction does not enlarge or alter the scope of claims substantially.

(2) Correction B

Correction B is a correction for achieving consistency between the description in [0006] in the detailed description of the invention and the description in the scope of claims in accordance with Collection A for correcting Claim 1 of the scope of claims, which falls under a correction for the purpose of clarification of an ambiguous statement. As with the reasons indicated in the above 2. 2. (1), the correction is within the matters described in the Patent description, and it is obvious that the correction does not enlarge or alter the scope of claims substantially.

3. Requirements of independent patentability regarding the inventions unconcerned in the request for invalidation trial in the invention after correction

The correction on the Correction 1 is a correction to restrict Claim 1. Claims 2 to 6 and Claim 12 cite Claim 1 directly or indirectly. When the invention according to Claim 1 is corrected restrictively, the inventions according to Claims 2 to 6 and Claim 12 are to be corrected restricted, accordingly. Therefore, requirements of independent patentability are examined on the inventions according to Claims 2 to 6 and Claim 12 which are not of concern in the request for invalidation trial.

The matters specified in Claims 2 to 6 and Claim 12 are not described or indicated in the means of proof submitted by the demandant, and no reasons for invalidating the patent regarding the inventions according to Claims 2 to 6 and Claim 12. It cannot be said that the inventions are not independently patentable at the time of filing of the patent application.

4. Closing

As described above, the correction falls under the proviso to Article 134(2) of the Patent Act before revision by the Act of 1994, falls under the provision of Article 126(2) of the Patent Act before revision by the Act of 1994 which is applied mutatis mutandis pursuant to the provisions of Article 134-2(5), and falls under the provision of

Article 126(3) of the Patent Act before revision by the Act of 1994 which is applied mutatis mutandis by replacing certain terms pursuant to Article 134-2(5) of the Patent Act. Therefore the correction shall be approved as a legal correction.

No. 3 Invention according to Claim 1 of the Patent of the case

The invention according to Claim 1 of the Patent of the case (hereinafter referred to as "Patent invention") is recognized as follows, as described in Claim 1 of the scope of claims, in light of the descriptions in the corrected description and drawings.

"[Claim 1] A laser machining apparatus for cutting/welding a work by collecting a laser beam output from a laser oscillator by means of a converging optical member comprising: a laser beam reflecting member which is arranged in a transmission path of the laser beam and elastically deforms with a fluid pressure; a reflecting member supporting section supporting the peripheral section of the laser beam reflecting member and, together with the laser beam reflecting member, forming a space on an opposite side of a laser beam reflecting surface; fluid supply means for supplying a gas into the space in the reflecting member supporting section; an electropneumatic valve for switching fluid supply pressure successively; and fluid discharge means for discharging the gas from the space in the reflecting member supporting section, wherein the space, except for a fluid feed path and a fluid discharge path distinct from the fluid feed path, is sealed; and wherein a fluid pressure required for elastically deforming the laser beam reflecting member is applied to the opposite side of the laser beam reflecting surface."

No. 4 Allegations of the parties

1. Demandant's allegation

The demandant demanded the decision, in the written request for trial, that the patent for the invention according to Claim 1 before correction of the patent of the case be invalidated, and alleged as, reasons for invalidation, Reason for invalidation 1 according to Article 29(1)(iii) of the Patent Act and Reason for invalidation 2 according to Article 29(2) of the Patent Act. In the first oral proceedings, the demandant withdrew Reason for invalidation 1 on the assumption of approval of the correction according to the correction request. Therefore, the reasons for invalidation alleged by the demandant are as outlined below.

The Patent invention could be easily invented by a person skilled in the art, on the basis of the invention described in Evidence A No. 1 and well-known technical maters indicated in Evidences A No. 2 to No. 9, and the demandee should not be granted a patent for the invention under the provisions of Article 29(2) of the Patent Act. Thus, the patent according to the Patent invention falls under Article 123(1)(ii) of the Patent Act and should be invalidated.

Evidences A No. 1 to No. 9 were submitted as means of proof.

Evidence A No. 1 German Utility Model Registration No. 9407288 (published on September 15, 2014)

Evidence A No. 2 Japanese Unexamined Patent Application Publication No. H1-166894
Evidence A No. 3 Japanese Unexamined Patent Application Publication No. H1-219801
Evidence A No. 4 Japanese Unexamined Patent Application Publication No. S61-159613
Evidence A No. 5 Japanese Unexamined Patent Application Publication No. S57-6804
Evidence A No. 6 "New edition Hydraulic and Pneumatic handbook" edited by Japan Hydraulics & Pneumatics Society, Ohmsha, First edition First copy published on February 25, 1989, pp. 482-483 and pp. 558-561
Evidence A No. 7 Japanese Unexamined Patent Application Publication No. H7-36551
Evidence A No. 8 Japanese Unexamined Patent Application Publication No. H4-356395
Evidence A No. 9 Japanese Patent Publication No. H5-63272

2. Demandee's allegation

According to the written reply as of December 7, 2010, the oral proceedings statement brief as of February 16, 2011, and the oral proceedings statement brief as of March 2, 2011, the demandee demanded the decision that the demand for trial of the case was groundless. The allegation is as outlined below.

(1)<Regarding the specifying of the Patent invention>
(See the written reply p. 9 the fourth line from the bottom to p. 10 l. 14, and the statement brief 6. (1) A.)

In light of the description in [0026] in the Patent description and the description of Claim 2, the meaning of the term "discharge" in the patent of the case should be interpreted as "discharging to the outside of the device without circulation."

(2)<Regarding different features between the Patent invention and the invention described in Evidence A No. 1>
(See the written reply p. 8 the fourth line from the bottom to p. 9 l. 9, the statement brief 6. (1) A., 6. (2) A., and the statement brief p. 7 the fifth line from the bottom to the last line.)

The term "discharge" in the patent of the case means "discharging to the outside of the device without circulation," while the invention described in Evidence A No. 1 includes no specification about a discharge path for "discharging." Therefore, they are different in "the point where a feed path for supplying a gas into the space is distinct from a discharge path for discharging the gas from the space."

They are also different in "the point of supplying a gas into a mirror back space of a curvature-variable mirror and changing a curvature radius of the mirror with a pressure of the gas" and "the point of adjusting the pressure of the gas supplied by means of an electropneumatic valve for changing the pressure successively."

(3) <Regarding the invention described in Evidence A No. 1>
A. <Regarding a difference of the purpose for arranging a fluid discharge path distinct

from a fluid feed path>
(See the written reply p. 9 l. 10 to p. 10 l. 14, and the statement brief 6. (2) E.)

The invention described in Evidence A No. 1 is based on a design concept that a curvature radius of an adaptive mirror 7 is changed by use of pressure water always flowing in the back space of mirrors 6, 7 so as to cool the adaptive mirror 7 (curvature-variable mirror) and the deflecting mirror 6. As an assumption of the invention, the pressure water as a cooling medium always flows at the back of the mirrors, and it is indispensable to connect two fluid conduits for the feed path and the discharge path of the pressure water with respect to the space at the back of the mirrors.

The fluid discharge path of the invention described in Evidence A No. 1 is arranged for allowing the pressure water to always flow in the mirror back space for cooling and for allowing discharged cooling water, the cooling water being considered to be circulating in a closed path, to circulate and return from the mirror back space.

Meanwhile, the Patent invention is based on a concept that gas pressure is changed by the electropneumatic valve so as to change a curvature radius of the curvature-variable mirror with the pressure of the gas, and that the discharge path for discharging the gas from the space at the back of the mirrors is arranged distinct from the feed path for supplying the gas into the space, to change a curvature radius of the laser beam reflecting member at a high speed. Thus, they are fundamentally different from each other.

B. <Regarding the invention described in Evidence A No. 1 using a stepwise magnetic valve>
(See the written reply p. 10 l. 15 to the last line, p. 24 l. 11 to l. 14.)

The purpose of the invention described in Evidence A No. 1 is to correct the change in focusing position due to a position of a laser cutting head, and stepwise adjustment of three magnetic valves with 4 stages at most is satisfactory. Meanwhile, the Patent invention is configured to change a laser beam diameter in accordance with the type or thickness of a work as well as correcting the change in laser beam diameter due to a position of a machining head, and employs an electropneumatic valve which can switch gas pressure successively so as to freely control a curvature radius of the curvature-variable mirror.

C. <Regarding the meaning of "Fluid" of Evidence A No. 1>
(See the statement brief 6. (1) B. and 6. (3) A.)

The term "Fluid" in Evidence A No. 1 should be interpreted as "fludo" (in Japanese), and "fludo" (in Japanese) means liquid. There is no description "ryutai" (fluid in Japanese) in Evidence A No. 1, accordingly.

Even if the "Fluid" is interpreted as "ryutai," it does not mean that a gas, which is a subordinate concept, is disclosed in Evidence A No. 1.

Even if the "Fluid" is interpreted as "ryutai," since the cooling water is disclosed as a cooling medium in Evidence A No. 1, it does not mean that "ryutai" in Evidence A No. 1 includes a "gas," which is not suitable as a cooling medium.

D. <Regarding Evidence A No. 1 including no indication about smooth adjustment of focusing position>
(See the written reply p. 23 the 10th line from the bottom to p. 24 l. 8, and the statement

brief 6. (1) C. and 6. (3) B.)

Evidence A No. 1 does not describe that it is preferable to smoothly adjust the focusing position, but describes that stepwise control is preferable.

Regarding the configuration of FIG. 1 to FIG. 4 of Evidence A No. 1, there is no description or indication about smooth adjustment of the focusing position. In a configuration using cooling water, pressure cannot be adjusted smoothly.

(4) <Regarding Evidences A No. 2 to No. 4>
(See the written reply 7. 4 (1) (ii), and the statement brief 6. (1) D.)

In Evidences A No. 2 to No. 4, there is no description or indication about including an electropneumatic valve for successively switching fluid supply pressure, or arranging a discharge path for discharging a gas from the mirror back space, distinct from a feed path for supplying the gas into the space.

(5) <Regarding Evidence A No. 5>
(See the written reply 7. 4 (1) (iii).)

The discharge path in Evidence A No. 5 arranged for allowing a cooling medium to always flow in the mirror back space for cooling is completely different from the discharge path in the Patent invention arranged for quickly changing a pressure of a gas in the mirror back space. In Evidence A No. 5, there is no description or indication about changing a curvature radius of a reflecting mirror by use of pressure of a gas, or about including an electropneumatic valve for switching fluid supply pressure successively.

(6) <Regarding Evidences A No. 6 and No. 7>
(See the written reply 7. 4 (1) (iv).)

It cannot be said that it is easy to use an electropneumatic valve for controlling mirror curvature of a laser machining device, especially a curvature-variable mirror, only from Evidences A No. 6 and No. 7.

(7) <Regarding Evidence A No. 8>
(See the written reply p. 15 l. 9 to l. 27.)

It cannot be said that it is easy to use an electropneumatic valve for changing a pressure of a gas to be supplied into a space at the back of the mirror in order to change a curvature radius of a curvature-variable mirror, only from Evidence A No. 8.

(8) < Regarding Evidence A No. 9>
(See the written reply 7. 4 (1) (vi).)

In Evidence A No. 9, there is no concept about supplying a gas via an electropneumatic valve, or no description or indication about switching fluid supply pressure with the electropneumatic valve. It cannot be said that it is easy to use an electropneumatic valve for changing a pressure of a gas to be supplied into the space at the back of the mirror in order to change a curvature radius of a curvature-variable mirror.

(9) <Regarding the combination of the invention described in Evidence A No. 1 and the well-known technical matters indicated in Evidences A No. 2 to No. 9>

A. <About not being able to easily conceive of arranging a fluid feed path distinct from a fluid discharge path>
(See the written reply p. 18 the second line from the bottom to p. 20 l. 1, 7. 4 (2) (i), and 7. 4 (2) (iii).)

In any of Evidences A No. 1 to No. 9, there is no disclosure or indication about using a gas as a cooling medium, and there is only disclosure about arranging only one path in the space at the back of the mirror.

At the time of filing the application for the Patent invention, there was no technical idea that gas pressure is changed by an electropneumatic valve so as to change a curvature radius of a curvature-variable mirror with the gas pressure, or that a discharge path for discharging a gas from the space at the back of the mirror is arranged distinct from a feed path for supplying the gas into the space to change a curvature radius of a laser beam reflecting member at a high speed.

The configuration of the invention described in Evidence A No. 1 is inevitable only when the cooling medium and the pressure medium are the identical liquid and the cooling medium circulates. When a liquid or gas is used as a pressure medium, it is natural that a pressure is increased and reduced via one path, as indicated in Evidences A No. 2 to No. 4.

Therefore, the configuration including a fluid feed path and a fluid discharge path separate from each other and using a gas which is used as a pressure medium without circulation, could not be easily conceived by a person skilled in the art.

B. <About not being able to easily conceive of applying an electropneumatic valve to the invention described in Evidence A No. 1>
(See the written reply p. 11 l. 1 to 5, p. 15 the second line from the bottom to p. 16 l. 25, p. 20 l. 2-l. 19. 7. 4 (2) (ii), p. 24 l. 9-l. 10, 7. 4 (2) (v), and the statement brief 6. (1) E.)

In the invention described in Evidence A No. 1, a curvature radius is changed by a liquid, pressure water, and an electropneumatic valve cannot be applied.

The electropneumatic regulator in Evidence A No. 8 controls a pressure of a flowing gas. The curvature-variable mirror in the Evidences A No. 2 to No. 4 controls a curvature radius of a mirror with a pressure of a gas, which is not flowing, in a sealed space. There is a difference in a state of the gas (whether or not the gas is flowing). A person skilled in the art cannot easily conceive of applying an electropneumatic regulator in Evidence A No. 8 to the curvature-variable mirror which controls a curvature radius with gas pressure, accordingly.

Evidences A No. 6 to No. 9 are not motive for application of an electropneumatic valve to control a curvature-variable mirror. A person skilled in the art cannot easily conceive of applying an electropneumatic valve to the invention described in Evidence A No. 1, accordingly.

C. <Regarding a disincentive of substituting a gas for pressure water of the invention described in Evidence A No. 1>
(See the statement brief 6. (2) C.)

The invention described in Evidence A No. 1 can be implemented only by using Fluid, which can transfer heat at the same level as water, as a cooling medium. The Fluid cannot be an air or gases other than air.

A person skilled in the art can intuitively recognize that it is impossible to obtain cooling effect at the same level as water by supplying a gas onto the back of a reflecting mirror of a laser, and cannot conceive of using compressed air substitute for the pressure water of the invention described in the Evidence A No. 1.

No. 5 Examination on the reasons for invalidation

1. The matters described in Evidence A No. 1 and the invention described in Evidence A No. 1

Evidence A No. 1 includes the following description. In Evidence A No. 1, (a) for umlaut, (u) for umlaut, and (o) for umlaut are referred to as ae, ue, and oe, respectively, and Eszett is referred to as ss. The portions in brackets are interpretations with corrections added by the body on the basis of the attachment to Evidence A No. 1 by the demandant. Underlines are added to the corrections.

(1) Description in Evidence A No. 1 p. 1 the eighth line from the bottom to p. 2 l. 2

「Die Erfindung betrifft eine Laserschneidmaschine mit einem Lasergenerator sowie mit einem Laserschneidkopf, welcher mittels eines durch eine numerische Steuerung gesteuerten Antriebs relativ zu dem Lasergenerator und/oder relativ zu einem zu bearbeitenden Werkstueck in einer Ebene im wesentlichen parallel zu dem Werkstueck verschiebbar ist und eine Fokussieroptik fuer den Laserstrahl sowie eine Stelleinrichtung zur Einstellung der Fokuslage des Laserstrahls durch Verlagerung des Fokus' gegenueber dem Laserschneidkopf im wesentlichen senkrecht zu dem Werkstueck aufweist. 」

(The invention relates to a laser cutting device having a laser oscillator and a laser cutting head, the laser cutting head being movable in a plane substantially parallel to a member to be machine, with respect to the laser oscillator and/or the member to be machined, by use of a power to be controlled by a numerical control device, and comprising a converging optical system for laser beam and an adjustment device for adjusting a focusing position of a laser beam by moving a focal point for the laser cutting head substantially perpendicularly to the member to be machined.)

(2) Description in Evidence A No. 1 p. 3 the fourth line from the bottom to p. 3 the last line

「Der Erfindung liegt nun die Aufgabe zugrunde, eine unter Werkstattbedingungen funktionstuechtige und fuer den automatisierten Betrieb geeignete Laserschneidmaschine bereitzustellen, die eine funktionssichere optische Einstellung der Fokuslage erlaubt. 」

(The invention is based on a problem to provide a laser cutting device suitable to a functional automated operation under the condition of a work place, functionally reliable, and allowing for optical adjustment of a focusing position.)

(3) Description in Evidence A No. 1 p. 4 l. 1 to l. 13

「Diese Aufgabe wird erfindungsgemaess dadurch geloest, dass bei einer Laserschneidmaschine der eingangs genannten Art die numerische Steuerung zur Einhaltung einer senkrecht zu dem Werkstueck gleichbleibenden Fokuslage zusaetzlich die Stelleinrichtung zur Einstellung der Fokuslage in Abhaengigkeit von der Position des Laserschneidkopfs in dessen Bewegungsebene parallel zu dem Werkstueck steuert. Mittels der numerischen Steuerung wird zunaechst die Position des Laserschneidkopfs stellvertretend fuer die Laenge des Laserstrahls erfasst. Jeder Position des Laserschneidkopfs und somit jeder Laserstrahllaenge ist eine bestimmte Einstellung der Stelleinrichtung zur Variierung der Fokuslage zugeordnet. Durch die numerische Steuerung gesteuert, wird die Stelleinrichtung in die jeweilige Solleinstellung gebracht. 」

(According to the device, the problem is solved by a numerical control device, which maintains the focusing position perpendicular to the member to be machined unchanged, in the case of a laser cutting device of the above type, controlling the adjustment device for adjusting a focusing position, in accordance with a location of the laser cutting head with a moving surface parallel to the member to be machined. By use of the numerical control device, the location of the laser cutting head is grasped first instead of a length of the laser beam. A predetermined adjustment value of the adjustment device for changing the focusing position is allocated to each of the locations of the laser cutting head, or each laser beam length. The adjustment device is controlled by the numerical control device and the locations thereof are target positions.)

(4) Description in Evidence A No. 1 p. 4 l. 14 to p. 5 l. 5

「Grundsaetzlich ist es moeglich, die Stelleinrichtung zur Einstellung der Fokuslage mittels der numerischen Steuerung stufenlos zu verstellen und jeder punktuellen Position des Laserschneidkopfs eine bestimmte Einstellung der Stelleinrichtung zuzuordnen. Zur Vereinfachung der Steuerung aber ist bei einer bevorzugten Ausfuehrungsform der erfindungsgemaessen Laserschneidmaschine vorgesehen, dass der Laserschneidkopf innerhalb eines in wenigstens zwei Teilbereiche unterteilten Bewegungsbereichs verschiebbar ist und dass jedem Teilbereich ein Verstellwert zur Einstellung einer gleichbleibenden Fokuslage zugeordnet ist. Die Anzahl der Teilbereiche wird zweckmaessigerweise in Abhaengigkeit von der Groesse der Flaeche gewaehlt, die mit dem Laserschneidkopf waehrend des Bearbeitungsvorgangs bestrichen wird. Auf der Grundlage des fuer jeden Teilbereich vorgegebenen Verstellwerts steuert die numerische Steuerung die Verstellung der Stelleinrichtung fuer die Fokuslage. Eine Verstellung der Stelleinrichtung wird stets dann veranlasst, wenn der Laserschneidkopf von einem Teilbereich seines Bewegungsbereichs in einen diesem benachbarten Teilbereich wechselt. 」

(Basically, positions of the adjustment device for adjusting the focusing position can be adjusted smoothly by use of the numerical control device, and predetermined adjustment values of the adjustment device can be allocated to the locations of the laser cutting head. However, for easy control, in a preferable embodiment of a laser cutting device of the device, the laser cutting head can move in a moving area having at least

two partial areas, and the adjustment values for adjusting the focusing position unchangeably are allocated to the partial areas. The number of the partial areas is preferably selected in accordance with the size of a surface swept during machining by the laser cutting head. On the basis of the adjustment values allocated to the partial areas, the numerical control device controls the adjustment values of the adjustment device for focusing position. The location adjustment of the adjustment device is always performed when the laser cutting head moves from a partial area of the moving area to an adjacent area.)

(5) Description in Evidence A No. 1 p. 5 l. 6 to p. 6 l. 10

「Eine weitere Ausfuehrungsform der Erfindung, bei der die Stelleinrichtung zur Einstellung der Fokuslage wenigstens einen der Fokussieroptik in Richtung des Laserstrahls vorgeschalteten Umlenkspiegel fuer den Laserstrahl aufweist, welcher an der seiner Spiegelflaeche abgewandten Flaeche von einem unter veraenderbarem Druck stehenden Fluid beaufschlagt und dadurch adaptiv gekruemmt wird, zeichnet sich dadurch aus, dass der Umlenkspiegel ueber eine stellbare Drosselanordnung mit Fluid beaufschlagt wird, mittels derer der Druck des Fluids veraenderbar ist und dass die numerische Steuerung der erfassten Position des Laserschneidkopfs als Verstellwert zur Einstellung der Fokuslage einen Sollwert fuer den Druck des Fluids zuordnet und zur Einstellung dieses Sollwerts die stellbare Drosselanordnung steuert. Durch Regulierung des Durchflussquerschnitts der stellbaren Drosselanordnung wird der an deren Ausgangsseite anstehende Druck des Fluids reguliert. Dementsprechend kann die Spiegelflaeche des stromabwaerts der Drosselanordnung gelegenen Umlenkspiegels mit variablen Druecken beaufschlagt und in seiner Kruemmung veraendert werden. Von der Kruemmung der Spiegelflaeche abhaengig ist die Konvergenz bzw. die Divergenz des durch den Umlenkspiegel auf die Fokussieroptik reflektierten und von dieser auf das Werkstueck gebuendelten Laserstrahls. Infolgedessen Fuehrt eine Veraenderung des an der Ausgangsseite der stellbaren Drosselanordnung anstehenden und auf die Rueckseite der Spiegelflaeche des Umlenkspiegels wirkenden Fluiddrucks zu einer Aenderung der Fokussierungsverhaeltnisse an der Fokussieroptik und somit zu einer Einstellung der Fokuslage des Laserstrahls senkrecht zu dem Werkstueck. Mittels der numerischen Steuerung wird ueber den Verstellwert die Stelleinrichtung zur optischen Einstellung der Fokuslage derart gesteuert, dass sich ueber den gesamten Bewegungsbereich des Laserschneidkopfs in dessen Bewegungsebene parallel zu dem zu bearbeitenden Werkstueck bezogen auf letzteres eine einheitliche Fokuslage einstellt. 」

(In any further embodiment of the device, the adjustment device for adjusting the focusing position includes at least one deflecting mirror for laser beam located in a stage preceding the converging optical system in a laser beam direction. The deflecting mirror is pushed by a fluid under a variable pressure on a surface opposite a mirror surface thereof, and adaptively deformed. The fluid is applied to the deflecting mirror via an adjustable throttle device which can change fluid pressure. The numerical control device allocates a predicted fluid pressure value as an adjustment value for

adjusting the focusing position to the location where the laser cutting head is grasped, and controls the adjustable throttle device for adjusting the predicted value. A flow-rate cross section of the adjustable throttle device is controlled, to control fluid pressure at an output side thereof. In response thereto, the mirror surface of the deflecting mirror arranged downstream of the throttle device is pushed by variable pressure, and a curvature radius thereof is changed. Convergence or diffusion of the laser beam reflected on the converging optical system by the deflecting mirror and converged on the member to be machined from the converging optical system depends on the curvature radius of the mirror surface. Accordingly, when the fluid pressure at the output side of the adjustable throttle device and acting on the back face of the mirror surface of the deflecting mirror changes, convergence ratio with respect to the converging optical system is changed, and the focusing position of the laser beam perpendicular to the member to be machined is adjusted. The adjustment device for optically adjusting the focusing position is controlled via the adjustment values by use of the numerical control device so that uniform focusing position based on the member to be machined may be adjusted in the whole of the moving area of the laser cutting head with the moving surface parallel to the member to be machined.)

(6) Description in Evidence A No. 1 p. 7 l. 6 to l. 15

「Wird eines der parallel geschalteten Drosselventile permanent von Fluid durchstroemt, so ist bei Verwendung eines als Kuehlmittel geeigneten Fluids stets eine hinreichende Kuehlung der Spiegelflaeche des Umlenkspiegels gewaehrleistet. Zweckmaessigerweise entspricht der Druck des Fluids, der sich an der Ausgangsseite der Drosselanordnung einstellt, wenn die uebrigen Drosselventile der Drosselanordnung in Schliessstellung geschaltet sind und lediglich das permanent geoeffnete Drosselventil von Fluid durchstroemt wird, einem einem Teilbereich der Laserschneidkopfbewegung zugeordneten Druck-Sollwert. 」

(When a fluid always flows in one of throttle valves connected in parallel, the fluid being suitable as a cooling medium, sufficient cooling of the mirror surface of the deflecting mirror can be secured. Preferably, when other throttle valves of the throttle device are switched to a closed position and a fluid flows only in always-open throttle valves, the fluid pressure adjusted at the output side of the throttle device corresponds to the predicted pressure value allocated to the moving partial area of the laser cutting head.)

(7) Description in Evidence A No. 1 p. 11 l. 1 to l. 8

「Wie Figur 1 zu entnehmen ist, wird bei Laserschneidmaschinen ein Laserstrahl 1 ausgehend von einem Lasergenerator 2 ueber Umlenkspiegel 3, 4, 5, 6, 7 zu einer als Sammellinse 8 ausgebildeten Fokussieroptik gelenkt. Die Sammellinse 8 buendelt den Laserstrahl 1 durch eine Duese 9 auf ein nicht dargestelltes Werkstueck. Die Duese 9 dient zur Aufgabe von Schneidgas in die Schneidspur des Laserstrahls 1. Bei dem Umlenkspiegel 7 handelt es sich um einen adaptiven Spiegel mit veraenderbarer Kruemmung. 」

(As shown in FIG. 1, in the laser cutting device, the laser beam 1 from a laser oscillator

2 is directed to a converging optical system constituted as a converging lens 8 via deflecting mirrors 3, 4, 5, 6 and 7. The converging lens 8 converges the laser beam 1 on a member to be machined (not shown) by means of a nozzle 9. The nozzle 9 is used for charging a cutting trajectory of the laser beam 1 with cutting gas. The deflecting mirror 7 treats an adaptive mirror with variable curvature radius.)

(8) Description in Evidence A No. 1 p. 12 the sixth line from the bottom to p. 13 l. 2
「Die Vorrichtung nach Figur 1 bedient sich zu diesem Zweck des adaptiven Spiegels 7. Der adaptive Spiegel 7 besitzt eine polierte Spiegelflaeche 12, die von der Oberflaeche einer duennen Metallscheibe gebildet wird. Diese duenne Metallscheibe ist mit ihren Raendern in den Fassungsring eines Spiegelgehaeuses 13 eingespannt. Von der Spiegelflaeche 12 wird der einfallende Laserstrahl 1 zu einer Sammellinse 8 reflektiert, die den Laserstrahl 1 auf die Werkstueckoberflaeche buendelt. 」

(The device in FIG. 1 is operated, for this purpose, by using an adaptive mirror 7. The adaptive mirror 7 includes a polished mirror surface 12 formed by a surface of a thin metal disk. The thin metal disk has an edge set in an attachment ring of a mirror case 13. The incident laser beam 1 is reflected by the mirror surface to the converging lens 8 which converges the laser beam 1 onto a surface of the member to be machined.)

(9) Description in Evidence A No. 1 p. 13 l. 3 to l. 22
「An der der Spiegelflaeche 12 abgewandten Flaeche wird die Metallscheibe des Spiegels ueber eine Fluidleitung 14 mit Druckwasser beaufschlagt. Da die Metallscheibe des dargestellten Spiegels 7 bei einem Druck von 1,25 bar plan gefertigt worden ist, ergibt sich ein planer Verlauf der Spiegelflaeche 12 dann, wenn in der Fluidleitung 14 Druckwasser mit einem Druck von 1,25 bar ansteht. Sinkt der Druck in der Fluidleitung 14 unter diesen Wert ab, so nimmt die Spiegelflaeche 12 ein konkave Form an, wie dies in der rechten Teildarstellung der Figur 2 gezeigt ist. Entsprechend fuehrt eine Erhoehung des Drucks in der Fluidleitung 14 ueber 1,25 bar zu einer konvexen Verformung der Spiegelflaeche 12. Der Grad der Konvexitaet bzw. Konkavitaet der Spiegelflaeche 12 kann durch Steuerung des Drucks in der Fluidleitung 14 eingestellt werden. Wie bei Vergleich der linken und der rechten Darstellung von Figur 2 zu erkennen ist, fuehrt eine Veraenderung der Kruemmung der Spiegelflaeche 12 zu einer Veraenderung der Konvergenz bzw. Divergenz des von der Spiegelflaeche 12 reflektierten Laserstrahls 1. In Abhaengigkeit von der sich einstellenden Geometrie des Laserstrahls 1. variiert die Lage des von der Sammellinse 8 erzeugten Fokus des Laserstrahls 1 senkrecht zu dem Werkstueck. 」

(Pressure water is applied to the metal disk of the mirror on a surface opposite the mirror surface 12 via a fluid conduit 14. The metal disk of the mirror 7 shown in the figure is manufactured so as to form a plane with pressure of 1.25 bar. If pressure water with a pressure of 1.25 bar exists in the fluid conduit 14, a curved line of the mirror surface 12 is made flat. When the pressure in the fluid conduit 14 decreases below the value, the mirror surface 12 is concaved as shown in the right figure in FIG. 2.

When the pressure in the fluid conduit 14 exceeds 1.25 bar, the mirror surface 12 is deformed in a convex shape, accordingly. The concave or convex degree of the mirror surface 12 can be adjusted by controlling the pressure in the fluid conduit 14. Comparing the right and left figures in FIG. 2, when the curvature radius of the mirror surface 12 changes, convergence or diffusion of the laser beam 1 reflected from the mirror surface 12 is changed. In accordance with a geometric configuration of the adjusted laser beam 1, the focusing position of the laser beam 1, which is perpendicular to the member to be machined, generated by the converging lens 8 is changed.)

(10) Description in Evidence A No. 1 p. 13 l. 23 to p. 14 l. 8

「Eingestellt wird der in der Fluidleitung 14 anstehende Druck mit Hilfe der numerischen Steuerung der Laserschneidmaschine. Diese steht mit einer Drosselanordnung 15 in Verbindung, wie sie in Figur 3 dargestellt ist. Die Drosselanordnung 15 ist dem adaptiven Spiegel 7 in Stroemungsrichtung des Druckwassers vorgelagert und umfasst vier parallelgeschaltete Drosselventile 16, 17, 18, 19. Das Drosselventil 16 wird permanent von Druckwasser durchstroemt. Der Durchfluss von Druckwasser durch die Drosselventile 17, 18, 19 kann durch steuerbare Magnetventile 20, 21, 22 gesperrt bzw freigegeben werden. Eine feste Drossel 23 ist im Ruecklauf des Druckwassers vorgesehen; ein Druckregler 24 und ein Feinstfilter 25 sind der Drosselanordnung 15 vorgeschaltet. 」

(The pressure in the fluid conduit 14 is adjusted by use of the numerical control device of the laser cutting device. As shown in FIG. 3, the device is connected to the throttle device 15. The throttle device 15 is disposed in a stage preceding the adaptive mirror 7 in a flow direction of the pressure water, and includes four throttle valves 16, 17, 18, 19 connected in parallel. In the throttle valve 16, pressure water always flows. The flow rates of the pressure water passing through the throttle valves 17, 18, and 19 can be shut off or opened by controllable magnetic valves 20, 21, 22. A fixed valve 23 is arranged in a return path of the pressure water. A pressure adjuster 24 and a fine filter 25 are arranged in a stage preceding the throttle device 15.)

(11) Description in Evidence A No. 1 p. 14 l. 9 to l. 23

「Das von einer Druckquelle bereitgestellte Druckwasser wird der Drosselanordnung 15 ueber den Feinstfilter 25 und den Druckregler 24 zugefuehrt. Mittels des Druckreglers 24 wird ein maximaler Systemdruck vorgegeben. Da die feste Drossel 23 einen unveraenderlichen Durchflussquerschnitt besitzt und infolgedessen einen konstanten Staudruck aufbaut, kann der in der Fluidleitung 14 des adaptiven Spiegels 7 anstehende Druck durch Steuerung der Drosselanordnung 15 eingestellt werden. Da das Drosselventil 16 permanent von Druckwasser durchstroemt wird, wird der adaptive Spiegel 7 sowie der diesem nachgeschaltete Umlenkspiegel 6 stets mit einer gewissen als Kuehlmittel fungierenden Druckwassermenge versorgt. Bei dem dargestellten Ausfuehrungbeispiel steht bei geschlossenen Magnetventilen 20, 21, 22 an der Ausgangsseite der Drosselanordnung 15 und somit auch an der Rueckseite der Spiegelflaeche 12 des adaptiven Spiegels 11 ein Druck von 0,5 bar an.」

(The pressure water prepared by a pressure source is supplied to the throttle device 15 via the fine filter 25 and the pressure adjuster 24. By use of the pressure adjuster 24, the maximum device pressure is provided. The fixed throttle valve 23 with invariable flow-rate cross section generates constant dynamic pressure, thereby adjusting the pressure in the fluid conduit 14 of the adaptive mirror 7 by controlling the throttle device 15. Since the pressure water always flows in the throttle valve 16, some amount of pressure water functioning as coolant is supplied always to the adaptive mirror 7 and the deflecting mirror 6 located in a stage posterior to the adaptive mirror 7. In the embodiment shown in the figure, when the magnetic valves 20, 21, and 22 are closed, a pressure of 0.5 bar exists at the output side of the throttle valve 15 and at the back side of mirror surface 12 of the adaptive mirror 11.)

(12) FIG. 2 of Evidence A No. 1

In FIG. 2 of Evidence A No. 1, the "Spiegelgehaeuses 13" (mirror case 13) and the "Spiegelflaeche 12" (mirror surface 12) forms a space on the side opposite the reflecting surface of the "Spiegelflaeche 12" (mirror surface 12), and there are two paths leading to the space.

(13) FIG. 3 of Evidence A No. 1

In FIG. 3 of Evidence A No. 1, there are two paths, a path from the "Drosselventile 16, 17, 18, 19" (throttle valves 16, 17, 18, 19) to the "adaptiven Spiegels 7" (adaptive mirror 7), and a path from the "adaptiven Spiegels" (adaptive mirror 7) to the "feste Drossel 23" (fixed throttle 23).

(14) The invention described in Evidence A No. 1

The matters described in the above No. 5. 1. (7) disclose a laser cutting device that converges a laser beam 1 output from a laser oscillator 2 by use of a converging lens 8, for cutting a work, and indicates that an adaptive mirror is arranged in a transmission path of the laser beam 1.

The matters described in the above No. 5. 1. (8) disclose that, in the adaptive mirror, a peripheral part of a metal disk having a mirror surface 12 is supported by a mirror case 13, and, referring to the drawings in No. 5. 1. (12), it can be said that a space is formed at the opposite side of the mirror surface 12 of the metal disk, by the mirror case 13 and the metal disk having the mirror surface 12.

The matters described in the above No. 5. 1. (9) disclose that pressure of pressure water is supplied to the opposite side of the mirror surface 12 of the metal disk, to elastically deform the metal disk having the mirror surface 12.

The matters described in the above No. 5. 1. (10) and (11) disclose means for supplying pressure water, means for discharging the pressure water, or switching the pressure of the pressure water in four stages by the magnetic valves 20, 21, 22.

Referring to the descriptions in the above No. 5. 1. (10) and (11) and the drawings in the No. 5. 1. (12) and (13), pressure water is supplied via a fluid conduit 14 and another fluid conduit arranged separately from the fluid conduit 14. Referring to the descriptions in the above No. 5. 1. (9) to (11) and the drawings in No. 5. 1. (12) and (13), the space formed by the mirror case 13 and the metal disk having the mirror surface 12 is sealed except for the fluid conduit.

In light of the matters described in No. 5. 1. (1) to (11) and the drawings in No. 5. 1. (12) and (13), it can be recognized that Evidence A No. 1 describes the following invention (hereinafter referred to as "Invention described in Evidence A No. 1").

"A laser cutting device for cutting a work by converging a laser beam 1 output from a laser oscillator 2 by means of a converging lens 8 comprising: a metal disk having a mirror surface 12 which is arranged in a transmission path of the laser beam 1 and elastically deforms with a pressure of pressure water; a mirror case 13 supporting the peripheral section of the metal disk and forming a space at the opposite side of the mirror surface 12 of the metal disk together with the metal disk; pressure water supply means for supplying the pressure water into the space of the mirror case 13; magnetic valves 20, 21, 22 for switching the pressure of the supplied pressure water in four stages; and pressure water discharge means for discharging the pressure water from the space of the mirror case 13, wherein the space, except for a fluid conduit 14 supplying the pressure water and a fluid conduit distinct from the fluid conduit 14, is sealed; and wherein a pressure of the pressure water required for elastically deforming the metal disk is applied to the opposite side of the mirror surface 12 of the metal disk."

2. The matters described in Evidence A No. 2

p. 3 the upper right column l. 19 to the lower left column l. 7
"To change a curvature radius of the mirror (16) of the collimation part (11), a control signal (20) shown in FIG. 2 is transmitted to a pressure control device (19). In the pressure control device (19), a pressure generated in a pressure pump (18) is controlled to change a pressure of a gas (or liquid) (17) to be applied to the back of the mirror (16). The curvature radius of the mirror (16) is changed, and the curvature radius of the collimation part (11) is changed, accordingly."

3. The matters described in Evidence A No. 3

p. 2 the upper left column l. 17 to the upper right column l. 9
"The variable-focus reflecting mirror (1) is formed of a shell (2), a chamber pressure adjustment device (3), and a reflecting mirror (4).

The shell (2) includes a pressure chamber (5) having an opening where a holding part (7) is formed which holds the reflecting mirror (4) airtightly with an O-ring (6).

A pressure meter (8) of the chamber pressure adjustment device (3) and piping (9) are connected to the pressure chamber (5) of the shell (2). The piping (9) has a compressor piping system (9a) and a vacuum pump piping system (9b), and is switched by electromagnetic operation valves (10a) and (10b) as necessary for a compressor (11a) and a vacuum pump (11b). The switching is performed by opening/closing the electromagnetic operation valves (10a) and (10b)."

4. The matters described in Evidence A No. 4

(1) p. 3 the upper right column l. 13 to the lower left column l. 3
"In the reflecting curved mirror thus configured, when a pump 8 is operated by opening a valve 7, the air in the space 4 is discharged, and the pressure in the container 1

decreases below an outside pressure, thereby generating a pressure difference between both sides of the film 3, and the film 3 bends inward. A reflection surface 3a, which is an outer surface of the film, forms a substantial paraboloid of revolution. Thus, when electromagnetic waves, such as beams, are made incident on the curved mirror from the above, the electromagnetic waves are reflected by the reflection surface 3a, and converged in nearly one spot, which can be used as a concave mirror."

(2) p. 4 the lower left column l. 6 to l. 9
"In the above embodiments, a liquid can be substituted for a gas, which is a fluid to be supplied to or discharged from the space 4 in the container 1."

5. The matters described in Evidence A No. 6

(1) p. 482 the right column the fifth line from the bottom to p. 483 the left column l. 15
"2. 2. 6 Electric-pneumatic pressure control valve

This section shows a structure and performance examples of a valve which successively controls pneumatic output in accordance with an electric signal. As a valve embedded in a control valve, a spool valve, poppet valve, plate valve, and nozzle flapper valve are known. In operating the valves electrically, a magnetic body, such as a solenoid, torque motor, or movable coil, or a dielectric body represented by a piezoelectric element is used.

[1] Proportional flow-rate control valve and pressure control valve ..... Meanwhile, FIG. 4. 115 introduces secondary pressure (load-side pressure) to a pressure reaction chamber of a valve, balances it with an electromagnetic force of a solenoid, to proportionally control a current of the solenoid and the secondary pressure. [9)] "

(2) p. 558 the right column l. 23 to l. 30
"3. 6 Electric-pneumatic pressure control system
3. 6. 1 Control method using proportional valve, servo valve

Pneumatic control using a proportional valve has been applied to various fields. The proportional valve can be easily controlled by a microcomputer, and a position, pressure, or force can be quickly changed by an external command. The proportional valve will be used increasingly as a control element of a robot driving system or a flexible automated system."

(3) p. 558 the right column the third line from the bottom to p. 560 the left column l. 2
"TANAKA [6)] constitutes a pressure control servo mechanism with a pressure proportional valve to improve dynamic characteristics as compared with flow-rate control system, and confirms improvement in position control accuracy of a cylinder. A horizontal position control system of a cylinder using a pressure proportional valve is shown in FIG. 4. 279 [7)]."

6. The matters described in Evidence A No. 7

Paragraph [0001] to [0002]
"[0001]
[Industrial application] This invention relates to a pressure control device for an

electropneumatic regulator, more specifically to a pressure control device for an electropneumatic regulator that detects a pressure of a gas supplied to a pneumatic device, such as a cylinder, and controls the pressure of the gas at a set pressure.
[0002]
[Prior art] Conventionally, for controlling a gas supplied to a pneumatic device at a desired pressure, an electropneumatic regulator including a primary valve is used. A technical idea of electrically controlling a pressure of a gas supplied to the pneumatic device is disclosed in Japanese Unexamined Patent Application Publication No. H2-284213 'Electropneumatic regulator'."

7. The matters described in Evidence A No. 8

Paragraph [0001] to [0003]
"[0001]
[Industrial application] This invention relates to a laser machining device, specifically to gas pressure control of assist gas, or the like, to be supplied to a nozzle.
[0002] The laser machining device of this type is configured to emit a laser beam onto a work from a tip of a nozzle and jet a gas, such as assist gas, to cut the work. The pressure of the gas jetted from the nozzle is set and adjusted to an appropriate pressure in accordance with machining conditions, such as a material or thickness of the work.
[0003] The pressure of the gas supplied to the nozzle is adjusted by a regulator, such as an electropneumatic regulator, and the pressure of the gas discharged from the regulator is set on the basis of a gas pressure command from a controller, such as an NC device."

8. Comparison

The Patent invention is compared with the Invention described in Evidence A No. 1.

It is obvious that the "laser oscillator 2" and "laser beam 1" in the Invention described in Evidence A No. 1 correspond to the "laser oscillator" and "laser beam" in the Patent invention.

The "converging lens 8" in the Invention described in Evidence A No. 1, which converges the "laser beam 1," corresponds to the "converging optical member" in the Patent invention. The "laser cutting device" in the Invention described in Evidence A No. 1, which cuts a work, corresponds to the "laser machining apparatus for cutting/welding a work" in the Patent Invention.

The "pressure water" in the Invention described in Evidence A No. 1, which is a flowing continuous body, corresponds to the "fluid" in the Patent invention. The "pressure water" in the Invention described in Evidence A No. 1 is identical with the "gas" in the Patent invention in the point of "fluid" which is a flowing continuous body.

The "metal disk having a mirror surface 12" in the Invention described in Evidence A No. 1, which is arranged in a transmission path of the "laser beam 1," reflects the "laser beam 1," and elastically deforms with a pressure of the "pressure water," corresponds to the "laser beam reflecting member" in the Patent invention. The "mirror surface 12" of the Invention described in Evidence A No. 1 corresponds to the "laser beam reflecting surface" in the Patent invention.

The "mirror case 13" in the Invention described in Evidence A No. 1, which supports a peripheral part of the "metal disk" and forms a space together with the "metal

disk" at the opposite side of the "mirror surface 12" of the "metal disk," corresponds to the "reflecting member supporting section" in the Patent invention.

The "pressure water supply means" and "pressure water discharge means" in the Invention described in Evidence A No. 1, which supply the "pressure water" into the space formed by the "metal disk" and the "mirror case 13" and discharge it, are identical with the "fluid supply means" and "fluid discharge means" in the Patent invention, in the point of means for supplying or discharging the "fluid" which is a flowing continuous body.

The "magnetic valves 20, 21, 22" in the Invention described in Evidence A No. 1, which switch a pressure of the supplied "pressure water" in four stages, is identical with the "electropneumatic valve" in the Patent invention, in the point of "a valve for switching fluid supply pressure" as a flowing continuous body.

The "fluid conduit 14" and "a fluid conduit distinct from the fluid conduit 14" in the Invention described in Evidence A No. 1, which are a path for supplying the pressure water and a path for discharging the pressure water, are identical with the "fluid feed path" and "fluid discharge path distinct from the fluid feed path" in the Patent invention, in the point of a path for supplying a fluid which is a flowing continuous body and a path for discharging a fluid which is a flowing continuous body.

In view of the above, the Patent invention and the Invention described in Evidence A No. 1 are identical to and different from each other in the following features.

<Corresponding features>

A laser machining apparatus for cutting/welding a work by collecting a laser beam output from a laser oscillator by means of a converging optical member comprising: a laser beam reflecting member which is arranged in a transmission path of the laser beam and elastically deforms with a fluid pressure; a reflecting member supporting section supporting the peripheral section of the laser beam reflecting member and, together with the laser beam reflecting member, forming a space on an opposite surface of a laser beam reflecting surface; fluid supply means for supplying a fluid into the space in the reflecting member supporting section; a valve for switching fluid supply pressure; and fluid discharge means for discharging the fluid from the space in the reflecting member supporting section, wherein the space, except for a fluid feed path and a fluid discharge path distinct from the fluid feed path, is sealed; and wherein a fluid pressure required for elastically deforming the laser beam reflecting member is applied to the opposite surface of the laser beam reflecting surface."

<Different feature 1>

As the fluid to be supplied into the space of the reflecting member supporting section by the fluid supply means or the fluid discharged from the space of the reflecting member supporting section by the fluid discharge means, the Patent invention uses a gas, while the Invention described in Evidence A No. 1 uses pressure water.

<Different feature 2>

Regarding the valve for switching the fluid supply pressure, the Patent invention uses an electropneumatic valve for successively switching the fluid supply pressure, while the Invention described in Evidence A No. 1 uses a magnetic valve for switching the fluid supply pressure in four stages.

9. Judgment by the body

In examining the <Different feature 1>, it was a well-known matter before filing the application for the Patent invention to employ a gas as a fluid in a reflecting mirror which changes a curvature radius with fluid pressure, as described in Evidences A No. 2 to No. 4 indicated in the above No. 5. 2., No. 5. 3., No. 5. 4. (1) and (2). There is no particular disincentive that a gas cannot be substituted for pressure water in the invention described in Evidence A No. 1. It cannot be said that it is particularly difficult for a person skilled in the art to employ a gas in place of pressure water in the invention described in Evidence A No. 1, accordingly.

In examining the <Different feature 2>, as indicated in the above No. 5. 1. (4), there is an indication in Evidence A No. 1 that a focusing position is adjusted smoothly, and it is obvious that the focusing position can be adjusted smoothly in the reflecting mirror which changes a curvature radius with fluid pressure only by changing fluid pressure smoothly.

As described in Evidences A No. 6 to No. 8 indicated in the above No. 5. 5. (1) to (3), No. 5. 6., and No. 5. 7., considering that the presence of the electropneumatic valve is a well-known technical matter as means for changing fluid pressure smoothly, it can be said that a person skilled in the art could easily conceive of employing an electropneumatic valve for adjusting a focusing position smoothly in a reflecting mirror which changes a curvature radius with fluid pressure.

In examining the effect, the effect of the Patent invention, "changing a curvature radius of a laser beam reflecting member quickly to control a laser beam diameter as necessary at a high speed, the laser beam reflecting member which is cooled by a supplied fluid to prevent thermal deformation of the laser beam reflecting member due to irradiation of a laser beam" (Patent description [0044]), is recognized to be obtained by including fluid supply means and fluid discharge means, from the description of the Patent specification. The invention described in Evidence A No. 1 also includes both means and has the same effect obviously. Evidence A No. 1 includes a description about cooling of the laser beam reflecting member (No. 5. 1. (6)), and it is obvious that a response is shortened by arranging separate means dedicated for supplying and discharging a fluid. The effect of the Patent invention, which is an effect which can be predicted from the invention described in Evidence A No. 1 or the above well-known technical matters, is not remarkable.

In light of the above, the Patent invention is an invention which could be easily made by a person skilled in the art on the basis of the invention described in Evidence A No. 1, the well-known technical matters indicated in Evidences A No. 2 to No. 4, and Evidences A No. 6 to No. 8. The demandee should not be granted a patent for the invention under the provisions of Article 29(2) of the Patent Act.

10. Regarding the demandee's allegation

Even after examining the demandee's allegation, there is no reason for reversing the judgment by the body indicated in the above No. 5. 9.

(1) <Regarding the allegation indicated in the above No. 4. 2. (1)>

The demandee alleges that the meaning of the term "discharge" in the Patent invention should be interpreted as "discharging to the outside of the device without circulation," according to the descriptions in the Patent description [0026] and Claim 2.

Paragraph [0026] to be taken into consideration by the demandee includes the following description.

"[0026]

FIG. 3 illustrates a structure of a piping system in the case where air 15 discharged from a curvature-variable reflecting mirror holder 9 of a laser machining device according to the embodiment 1 in this invention is used as purge air. FIG. 4 illustrates a control circuit for keeping laser beam diameter constant in a position of a machining lens 29. FIG. 5 illustrates a control circuit for moving a machining head 28 in a z-axis direction in response to the change in distance from the machining lens 29 to the minimum focusing spot diameter. FIG. 6 illustrates a warning circuit on a pressure of the air 15 supplied to the curvature-variable reflecting mirror holder 9."

Claim 2 includes the following description.

"[Claim 2] The laser machining device described in claim 1 characterized in that a gas to be supplied for elastically deforming the laser beam reflecting member is discharged from the fluid discharge means and supplied into the laser beam transmission path, to be used as purge air for purging the inside of the laser beam transmission path." The above description indicates that the gas discharged from the fluid discharge means is used as purge air to purge the inside of the laser beam transmission path.

If the gas discharged from the fluid discharge means is used as purge air to purge the inside of the laser beam transmission path, and even if the purge air can be "discharged to the outside of the device without circulation," the Patent invention is as indicated in the above No. 3 and does not specify that the gas discharged by the fluid discharge means from the space in the reflecting member supporting section is used as purge air. Therefore, the term "discharge" in the Patent invention only means discharging from the space in the reflecting member supporting section, and there is no reason for being interpreted as "discharging to the outside of the device without circulation."

Thus, the demandee's allegation indicated in the above No. 4. 2. (1) is not enough reason for reversing the judgment by the body indicated in the above No. 5. 9.

(2) <Regarding the allegation indicated in the above No. 4. 2. (2)>

The demandee alleges that the invention described in Evidence A No. 1 does not include a discharge path for "discharging," on the assumption that the meaning of the term "discharge" in the patent as "discharging to the outside of the device without circulation.", and that the Patent invention and the Invention described in Evidence A No. 1 are different from each other in the point that "a feed path for supplying a gas into a space is separated from a discharge path for discharging the gas from the space."

The allegation assumes that the term "discharge" in the patent means "discharging to the outside of the device without circulation." As indicated in the above No. 5. 10. (1), the term "discharge" in the patent should not to be interpreted as "discharging to the outside of the device without circulation." Therefore, the allegation has no basis, and the allegation that the Patent invention and the Invention described in Evidence A No. 1 are different from each other in the point that "a feed

path for supplying a gas into a space is separated from a discharge path for discharging the gas from the space" must be incorrect.

Therefore, the demandee's allegation indicated in the above No. 4. 2. (2) is not enough reason for reversing the judgment by the body indicated in the above No. 5. 9.

(3) <Regarding the allegation indicated in the above No. 4. 2. (3) A. to B. and D.>
A. <Regarding the difference of the purpose for arranging a fluid discharge path distinct from the fluid feed path>

The demandee alleges that the invention described in Evidence A No. 1 is configured to connect two fluid conduits, the feed path and the discharge path, for the purpose of cooling the mirror surface 12, and that the Patent invention is based on a concept of changing gas pressure with an electropneumatic valve in order to change a curvature radius of the curvature-variable mirror with gas pressure and arranging a discharge path for discharging a gas from a space at the back of the mirror, separate from a feed path for supplying the gas into the space, to change a curvature radius of a laser beam reflecting mirror at a high speed.

Referring to No. 5. 1. (2), the problem of the invention described in Evidence A No. 1 is to provide a laser cutting device suitable to a functional automated operation under the condition of a work place, functionally reliable, and allowing for optical adjustment of a focusing position. As means for solving the problem, as indicated in No. 5. 1. (5) to (6), (8) to (9), a metal disk which uses pressure water for changing a curvature radius is employed.

As indicated in No. 5. 1. (11), the pressure in the fluid conduit 14 in the invention described in Evidence A No. 1 is adjusted by controlling the throttle device 15, on the assumption that the fixed throttle valve 23 generates constant dynamic pressure. A fluid conduit of the discharge path is connected to the fixed throttle valve 23, and the fluid conduit 14 of the feed path is connected to the throttle valve 15. Therefore, it can be said that the throttle device 15 is controlled in an environment where the two conduits, the feed path and discharge path for pressure water, are connected to the space formed by the mirror case 13 and the metal disk, to adjust pressure.

The invention described in Evidence A No. 1 adjusts a curvature radius of the mirror surface 12 by controlling the throttle device 15 to adjust pressure in an environment where the two conduits, the feed path and discharge path for pressure water, are connected to the space formed by the mirror case 13 and the metal disk, with respect to the subject of allowing for optical adjustment of a focusing position. The throttle device 15 is controlled for adjusting pressure, thereby adjusting a curvature radius of the mirror surface 12, and the connection of the two fluid conduits is not intended only for cooling the mirror surface 12.

The invention described in Evidence A No. 1 is configured to connect two fluid conduits, the feed path and discharge path for pressure water, and the effect of quickly changing a pressure of pressure water is an inevitable effect regardless of whether or not the effect is described in Evidence A No. 1.

The effect that the time required for accessing a closed space is made shorter when an entrance and an exit for the space are arranged separately than when a common doorway for the space is arranged, is an ordinarily observable technical matter in daily life; for example passengers get on/off a commuter train in a shorter time when a platform for boarding and a platform for leaving are arranged separately than in the case

of so-called "wait-in-line" system where a doorway to the commuter train is used for both purposes only in a leaving time zone and a boarding time zone with regulations.

With the assumption of the technical matter ordinarily observable in daily life, it must be said that a person skilled in the art in contact with the invention described in Evidence A No. 1 configured to connect two fluid conduits, the feed path and discharge path for pressure water, can recognize without particular difficulty the effect of changing a pressure more quickly than the reflecting member indicated in Evidences A No. 2 to No. 4 configured to connect only one common path for the feed path and discharge path.

In light of the above, the above demandee's allegation does not reverse the judgment by the body indicated in the above No. 5. 9.

B. <Regarding the invention described in Evidence A No. 1 which uses a stepwise magnetic valve>

The demandee alleges that an object of the invention described in Evidence A No. 1 is to correct the change of a focusing position due to a position of a laser cutting head, which is satisfied by stepwise adjustment of three magnetic valves with four stages at most, and while the Patent invention is configured to solve the problem of changing a laser beam diameter in accordance with the type or thickness of a work to be machined as well as correcting the change of the laser beam diameter due to a position of the machining head.

As indicated in the above No. 5. 1. (4), in view of the indication in Evidence A No. 1 about adjusting a focusing position smoothly and considering that a gas employed as a fluid in a reflecting mirror which changes a curvature radius with fluid pressure and an electropneumatic valve provided as means for changing fluid pressure smoothly are well-known technical matters, it can be said that a person skilled in the art could easily conceive of employing an electropneumatic valve for adjusting a focusing position smoothly in a reflecting mirror that changes a curvature radius with fluid pressure.

It is natural in a laser machining apparatus such as laser cutting device to change power or energy of a laser in accordance with the type or thickness of a work to be machined, and the facts that power or energy of a laser depends on a laser beam diameter and that the laser beam diameter depends on a focal distance are well-known technical matters. This allegation is not based on the description in the scope of claims at all.

In light of the above, even if Evidence A No. 1 does not indicate the problem of changing the laser beam diameter in accordance with the type or thickness of a work to be machined, the problem can be recognized by a person skilled in the art naturally. The problem can be solved by the invention described in Evidence A No. 1 that can change a focal distance. Therefore, the fact that the problem of changing a laser beam diameter in accordance with the type or thickness of a work to be machined is not directly indicated in Evidence A No. 1 does not reverse the judgment by the body indicated in the above No. 5. 9.

C. <Regarding Evidence A No. 1 including no indication about adjusting a focusing position smoothly>

The demandee alleges that, in Evidence A No. 1, there is a description that it is preferable to adjust a focusing position in stages, not smoothly, and there is no

description or indication about smooth adjustment of a focusing position for the configuration of FIG. 1 to FIG. 4 of Evidence A No. 1, and that a pressure cannot be smoothly adjusted in a configuration which uses cooling water.

However, as indicated in the above No. 5. 1. (4), it can be said that Evidence A No. 1 indicates smooth adjustment of a focusing position. The above No. 5. 1. (4) indicates, for easy control, a technical matter that a laser cutting head, in a preferable embodiment, can move in a moving area including at least two partial areas to each of which an adjustment value for adjusting a focusing position unchangeably is allocated. The matter only means controlling a focusing position in stages for easy control, and does not mean prohibiting smooth adjustment of the focusing position or excluding smooth adjustment of the focusing position.

The invention described in Evidence A No. 1 is configured to switch a focusing position in four stages by switching supply pressure of pressure water in four stages, but it does not inhibit a person skilled in the art from trying to adjust a focusing position smoothly.

In considering that Evidence A No. 1 indicates smooth adjustment of a focusing position and that a gas employed as a fluid in a reflecting mirror that changes a curvature radius with fluid pressure and an electropneumatic valve provided as means for changing fluid pressure smoothly are well-known technical matters, it can be said that a person skilled in the art could easily conceive of employing an electropneumatic valve for adjusting a focusing position smoothly in a reflecting mirror that changes a curvature radius with fluid pressure.

Therefore, the above demandee's allegation does not reverse the judgment by the body indicated in the above No. 5. 9.

(4) <Regarding the allegation indicated in the above No. 4. 2. (4)>

The demandee alleges that there is no description or indication in Evidences A No. 2 to No. 4 about providing an electropneumatic valve for switching fluid supply pressure successively, or providing a discharge path for discharging a gas from a mirror back space separately from a feed path for supplying the gas into the space.

As indicated in the examination on No. 5. 9 <Different feature 1>, referring to Evidences A No. 2 to No. 4, it can be recognized that employing a gas as a fluid in a reflecting mirror that changes a curvature radius with fluid pressure was a well-known technical matter before filing the application for the Patent invention.

Even if there is no description or indication in Evidences A No. 2 to No. 4 about providing an electropneumatic valve for successively switching fluid supply pressure successively or providing a discharge path for discharging a gas from a mirror back space separately from a feed path for supplying the gas into the space, the fact does not inhibit recognition that employing a gas as a fluid in a reflecting mirror that changes a curvature radius with fluid pressure was a well-known technical matter before filing the application according to the Patent invention.

In considering that Evidence A No. 1 indicates smooth adjustment of a focusing position and that a gas employed as a fluid in a reflecting mirror that changes a curvature radius with fluid pressure and an electropneumatic valve provided as means for changing fluid pressure smoothly are well-known technical matters, it can be said that a person skilled in the art could easily conceive of employing an electropneumatic valve for adjusting a focusing position smoothly in a reflecting mirror that changes a

curvature radius with fluid pressure.

Providing a feed path and a discharge path for a gas separately in adjusting a pressure of the space with a gas is a well-known technical matter as indicated in, for example, a microfilm of Japanese Utility Model Application No. S60-140785 (Japanese Unexamined Utility Model Application Publication No. S62-51411) Description p. 9 l. 12-l. 19, and Japanese Unexamined Patent Application Publication No. H5-149859 No. 3 l. 21-l. 26.

Therefore, even if there is no description or indication in Evidences A No. 2 to No. 4 about providing an electropneumatic valve for successively switching fluid supply pressure successively or providing a discharge path for discharging a gas from a mirror back space separately from a feed path for supplying the gas into the space, the fact does not reverse the judgment by the body indicated in the above No. 5. 9.

(5) <Regarding the allegation indicated in the above No. 4. 2. (5)>

The demandee alleges that the distinct discharge path in Evidence A No. 5 provided for allowing a cooling medium to flow always in a mirror back space for cooling, is completely different from the distinct discharge path in the Patent invention provided for quickly changing a pressure of a gas in the mirror back space, and that there is no description or indication about changing a curvature radius of a reflecting mirror using gas pressure or providing an electropneumatic valve for switching fluid supply pressure successively.

However, as indicated in the examination on the above No. 5. 9. <Different feature 1>, referring to Evidences A No. 2 to No. 4, it can be recognized that employing a gas as a fluid in a reflecting mirror that changes a curvature radius with fluid pressure is a well-known technical matter before filing the application for the Patent invention. The demandee's allegation on Evidence A No. 5 does not inhibit the recognition. The allegation of the demandee does not reverse the judgment by the body indicated in the above No. 5. 9.

(6) <Regarding the allegation indicated in the above No. 4. 2. (6) to (8)>

The demandee alleges that it cannot be easy to use an electropneumatic valve for a laser machining apparatus, especially mirror curvature control of a curvature-variable mirror, only from Evidences A No. 6 and No. 7, and it cannot be easy to use an electropneumatic valve for changing a pressure of a gas to be supplied to the space at the back of the mirror in order to change a curvature radius of the curvature-variable mirror only from Evidence A No. 8, and that Evidence A No. 9 has no concept of supplying a gas via an electropneumatic valve, does not indicate a concept of switching fluid supply pressure with an electropneumatic valve at all, so that it cannot be easy to use an electropneumatic valve for changing a pressure of a gas to be supplied to the space at the back of the mirror in order to change a curvature radius of the curvature-variable mirror.

As indicated in the examination of the above No. 5. 9. <Different feature 2>, referring to Evidences A No. 6 to No. 8, it can be recognized that an electropneumatic valve provided as means for changing fluid pressure smoothly is a well-known technical matter.

The above demandee's allegation does not inhibit a recognition that the electropneumatic valve provided as means for changing fluid pressure smoothly is a

well-known technical matter.

In considering that Evidence A No. 1 indicates smooth adjustment of a focusing position and that a gas employed as a fluid in a reflecting mirror that changes a curvature radius with fluid pressure and an electropneumatic valve provided as means for changing fluid pressure smoothly are well-known technical matters, it can be said that a person skilled in the art could easily conceive of employing an electropneumatic valve for adjusting a focusing position smoothly in a reflecting mirror that changes a curvature radius with fluid pressure.

Therefore, the above demandee's allegation does not reverse the judgment by the body indicated in the above No. 5. 9.

(7) <Regarding the allegation indicated in the above No. 4. 2. (9) A and B>

A. <About not being easily able to conceive of arranging the fluid feed path and the fluid discharge path distinct from each other>

The demandee alleges that a description about using a gas as a cooling medium is not disclosed or indicated in any of Evidences A No. 1 to No. 9 and there is a disclosure only about a constitution where only one path is provided in the space at the back of the mirror, and that the constitution of the invention described in Evidence A No. 1 shows inevitability only when the cooling medium and pressure medium are the same liquid and the cooling medium circulates, and it is natural to use one path for increasing and decreasing a pressure, as indicated in Evidences A No. 2 to No. 4, in using a liquid or a gas as a pressure medium only.

Referring to the above No. 5. 1. (2), the problem of the invention described in Evidence A No. 1 is to provide a laser cutting device which is suitable to a functional automated operation under the condition of a work place, functionally reliable, and allowing for optical adjustment of a focusing position. As means for solving the problem, as indicated in the above No. 5. 1. (5) to (6) and (8) to (9), a metal disk for changing a curvature radius with pressure water is employed.

As indicated in the above No. 5. (11), the pressure in the fluid conduit 14 in the invention described in Evidence A No. 1 is adjusted, on the assumption that the fixed throttle valve 23 generates constant dynamic pressure, by controlling the throttle device 15. A fluid conduit of the discharge path is connected to the fixed throttle valve 23, and the fluid conduit 14 of the feed path is connected to the throttle valve 15. Therefore, it can be said that the throttle device 15 is controlled in an environment where the two conduits, the feed path and discharge path for pressure water, are connected to the space formed by the mirror case 13 and the metal disk, to adjust pressure.

In the invention described in Evidence A No. 1, the state where the throttle valve 15 is controlled for adjusting a pressure by connecting two fluid conduits, a feed path and a discharge path for pressure water, in the space formed by the mirror case 13 and the metal disk, can be recognized independently from whether or not the pressure water has cooling performance. The pressure can be adjusted regardless of whether or not the pressure fluid for pressurizing the space formed by the mirror case 13 and the metal disk has a cooling effect, thereby solving the problem of the invention described in Evidence A No. 1 indicated in the above No. 5. 1. (2).

Since the invention described in Evidence A No. 1 describes that the throttle device 15 is controlled for adjusting a pressure by connecting two fluid conduits, a feed

path and a discharge path for pressure water, in the space formed by the mirror case 13 and the metal disk, even if the reflecting mirror indicated in Evidences A No. 2 to No. 4 uses one path for increasing and decreasing a pressure, there is no reason, in the invention described in Evidence A No. 1, for using one path for increasing and decreasing a pressure in the space formed by the mirror case 13 and the metal disk.

The demandee alleges that there was no technical idea, at the time of filing the application for the Patent invention, about changing gas pressure with an electropneumatic valve so as to change a curvature radius of a curvature-variable mirror with a pressure of a gas, and arranging a discharge path for discharging a gas from the space at the back of the mirror, distinct from a feed path for supplying a gas into the space to thereby a curvature radius of a laser beam reflecting member can be changed at a high speed.

However, as described in the Patent description [0043], "Although a fluid for applying a pressure is specified as Air, the fluid is not limited especially to Air, and other gases are available. Not a gas but a liquid, such as water, can be also available," the reason why a curvature radius of a laser beam reflecting member can be changed at a high speed is not that the fluid is a gas, but that the path for discharging the fluid from the space is arranged separately from the feed path. It can be recognized that, in the invention described in Evidence A No. 1, a pressure in the space can be quickly changed and a curvature radius of a reflecting member can be changed at a high speed by arranging a path for discharging a fluid from the space separately from a feed path, as indicated in the above No. 5. 10. (3).

In light of the above, the demandee's allegation does not reverse the judgment by the body indicated in the above No. 5. 9.

B. <About not being easily able to apply an electropneumatic valve to the invention described in Evidence A No. 1>

The demandee alleges that the invention described in Evidence A No. 1 is configured to change a curvature radius with a liquid, pressure water, and an electropneumatic valve cannot be applied, accordingly.

In the above No. 5. 9., it is determined that a person skilled in the art could easily conceive of employing an electropneumatic valve for adjusting a focusing position smoothly in a reflecting mirror that changes a curvature radius with fluid pressure, in considering that Evidence A No. 1 includes an indication of adjusting a focusing position smoothly and that a gas used as a fluid in a reflecting mirror that changes a curvature radius with fluid pressure and an electropneumatic valve provided as means for changing fluid pressure smoothly are well-known technical matters. Thus, the allegation does not reverse the judgment by the body in the above No. 5. 9.

The demandee alleges that the electropneumatic regulator in Evidence A No. 8 configured to control a pressure of a flowing gas is different in a state of a gas from the curvature-variable mirror in Evidences A No. 2 to No. 4 configured to control a pressure of a gas, which is not flowing, in a sealed space, so that, a person skilled in the art cannot easily conceive of applying the electropneumatic regulator in Evidence A No. 8 to a curvature-variable mirror which controls a curvature radius with pressure of a gas, and also alleges that Evidences A No. 6 to No. 9 are not motive for application of an electropneumatic valve to a curvature-variable mirror, so that, a person skilled in the art cannot easily conceive of applying an electropneumatic valve to the invention described

in Evidence A No. 1.

As indicated in the above No. 5. (11), the pressure in the fluid conduit 14 in the invention described in Evidence A No. 1 is adjusted, on the assumption that the fixed throttle valve 23 generates constant dynamic pressure, by controlling the throttle device 15. A fluid conduit of the discharge path is connected to the fixed throttle valve 23, and the fluid conduit 14 of the feed path is connected to the throttle valve 15. Therefore, it can be said that the throttle device 15 is controlled in an environment where the two conduits, the feed path and discharge path for pressure water, are connected to the space formed by the mirror case 13 and the metal disk, to adjust pressure.

Since the invention described in Evidence A No. 1 describes that the throttle device 15 is controlled for adjusting a pressure by connecting two fluid conduit, a feed path and a discharge path for pressure water, in the space formed by the mirror case 13 and the metal disk, even if the reflecting mirror indicated in Evidences A No. 2 to No. 4 uses one path for increasing and decreasing a pressure, there is no reason, in the invention described in Evidence A No. 1, for using one path for increasing and decreasing a pressure in the space formed by the mirror case 13 and the metal disk.

The throttle device 15 in the invention described in Evidence A No. 1 is identical with an electropneumatic regulator in Evidence A No. 8 in the point of controlling a pressure of a flowing fluid.

In considering that a gas used as a fluid in a reflecting mirror that changes a curvature radius with fluid pressure and an electropneumatic valve provided as means for changing fluid pressure smoothly are well-known technical matters, a person skilled in the art could easily conceive of employing an electropneumatic valve for adjusting a focusing position smoothly in a reflecting mirror that changes a curvature radius with fluid pressure.

In light of the above, the demandee's allegation does not reverse the judgment by the body indicated in the above No. 5. 9.

(8) <Regarding the allegation indicated in the above No. 4. 2. (3) C. and No. 4. 2. (9) C.)

The demandee alleges that it is incorrect to interpret the term in German "Fluid" in Evidence A No. 1 as "ryutai" (in Japanese).

According to the investigation by ex officio in the body, the following description is found, for example, in the item "fluid" in "Dictionary of Engineering and Scientific Terms (English, German, Japanese) the latest edition" (the first edition published by SANSHUSHA on November 1, 1985) ((u) for umlaut, and (o) for umlaut are referred to as ue and oe, respectively. The symbol "-" representing prolonged sound is added on "u" of "ryutai.").

"fluid ...../n [Phys] Fluid n (allgemeine Bezeichnung fuer stoemende Fluessigkeit oder stroemendes Gas) Ryutai ryutai [phys.]//Ryutai ryutai [chemistry, machine, marine]"
(general name of a flowing liquid or a flowing gas)

Referring to the above dictionary, interpreting "Fluid" in Germany as "ryutai" in the field of physics or mechanical engineering was a well-known technical matter

before filing the application for the Patent, and it must be said that there is no error for a person skilled in the art in the field of physics or mechanical engineering in contact with Evidence A No. 1 to interpret and understand "Fluid" in Germany in Evidence A No. 1 as "ruitai," and to recognize that the meaning thereof includes a gas as well as a liquid.

The demandee alleges that Evidence A No. 1 discloses cooling water as a cooling medium, even if "Fluid" is interpreted as "ryutai," so that, the "ryutai" in Evidence A No. 1 does not mean including "a gas" which is not suitable as a cooling medium, and also alleges that the invention described in Evidence A No. 1 can be implemented only by using "fludo" (in Japanese), which can transfer heat at the same level as water, as a cooling medium, the "fludo" cannot be an air or gases other than air, and that a person skilled in the art can intuitively recognize that it is impossible to obtain cooling effect at the same level as water by flowing a gas onto the back of a reflecting mirror of a laser, and cannot conceive of using compressed air substitute for the pressure water of the invention described in Evidence A No. 1.

Referring to the above No. 5. 1. (2), the problem of the invention described in Evidence A No. 1 is to provide a laser cutting device suitable to a functional automated operation under the condition of a work place, functionally reliable, and allowing for optical adjustment of a focusing position. As means for solving the problem, as indicated in No. 5. 1. (5), a metal disk which uses pressure water for changing a curvature radius is employed.

As indicated in the above No. 5. 1. (11), the pressure in the fluid conduit 14 in the invention described in Evidence A No. 1 is adjusted by controlling the throttle device 15, on the assumption that the fixed throttle valve 23 generates constant dynamic pressure. A fluid conduit of the discharge path is connected to the fixed throttle valve 23, and the fluid conduit 14 of the feed path is connected to the throttle valve 15. Therefore, it can be said that the throttle device 15 is controlled for adjusting a pressure in an environment where the two conduits, a feed path and a discharge path for pressure water, are connected to the space formed by the mirror case 13 and the metal disk, to adjust pressure.

In the invention described in Evidence A No. 1, the state where the throttle valve 15 is controlled for adjusting a pressure by connecting two fluid conduits, a feed path and a discharge path for pressure water, in the space formed by the mirror case 13 and the metal disk, can be recognized independently from whether or not the pressure water has cooling performance. The pressure can be adjusted regardless of whether or not the pressure water for pressurizing the space formed by the mirror case 13 and the metal disk has a cooling effect, thereby solving the problem of the invention described in Evidence A No. 1 indicated in the above No. 5. 1. (2).

The above No. 5. 1. (6) discloses that satisfactory cooling of the mirror surface can be secured when an appropriate fluid is used as a cooling medium. However, this disclosure only indicates a secondary effect of securing satisfactory cooling of the mirror surface, and does not aim only for securing satisfactory cooling of the mirror surface, nor for restricting a cooling medium to an appropriate fluid.

The demandee alleges that it is impossible to employ a gas as a cooling medium. For example, as indicated in Japanese Unexamined Patent Application Publication No. S61-253194 p. 2 lower right column l. 14 to p. 3 upper left column l. 2, Japanese Unexamined Patent Application Publication No. H5-8073 [0017], Japanese Utility

Model Publication No. H7-19673 No. 7 l. 23-l. 29, employing a gas as a cooling medium was a well-known technical matter before filing the application according to the Patent invention. Even if an appropriate fluid is used for a cooling medium as a fluid in Evidence A No. 1, it cannot be said that it is impossible to select a gas from the fluid.

In the Patent description [0044], the following effect is described, "As described above, this invention ..... the space, except for a fluid feed path and a fluid discharge path distinct from the fluid feed path, is sealed, and a fluid pressure required for elastically deforming the laser beam reflecting member is applied to the opposite side of the laser beam reflecting surface, thereby changing a curvature radius of a laser beam reflecting member quickly to control a laser beam diameter as necessary at a high speed, the laser beam reflecting member which is cooled by a supplied fluid to prevent thermal deformation of the laser beam reflecting member due to irradiation with a laser beam." The "supplied fluid" in the description is must be a gas according to the Patent invention. The Patent invention "has an effect of preventing thermal deformation of the laser beam reflecting member due to irradiation of a laser beam, wherein the "laser beam reflecting member" is cooled by a gas, which is the "supplied fluid," accordingly.

Therefore, the demandee's allegation that it is impossible to employ a gas as a cooling medium is not consistent with the description in the effect of the Patent invention that employs a gas as a cooling medium, and it is not convincing.

In light of the above, the demandee's allegation indicated in the above No. 4. 2. (3) C and No. 4. 2. (9) C. does not reverse the judgment by the body indicated in the above No. 5. 9.

11. Closing

The Patent invention could be easily made by a person skilled in the art, on the basis of the invention described in Evidence A No. 1 which is a publication distributed before filing the application according to the Patent invention, the well-known technical matters indicated in Evidences A No. 2 to No. 4, and the well-known technical matters indicated in Evidences A No. 6 to No. 8. The patent for the Patent invention violates the provisions of Article 29(2) of the Patent Act, falls under the provisions of Article 123(1)(ii) of the Patent Act, 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 14, 2011

Chief administrative judge: NOMURA, Toru
Administrative judge: CHIBA, Shigenari
Administrative judge: KARIMA, Hironobu