Trial decision

Invalidation No. 2015-800025

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The case of trial regarding the invalidation of the invention of Japanese Patent No. 5337323, entitled "Position Detecting Apparatus," between the parties above has resulted in the following trial decision:

Conclusion

The trial of the case was groundless.
The costs in connection with the trial shall be borne by the Demandant.

Reason
No. 1 History of the procedures
The history of the procedures as to the inventions according to claims 1 to 7 of the patent of the case, Japanese Patent No. 5337323, is as follows.
Jul. 5, 2013 As a part of the application of Japanese Patent Application No. 2011-222846 (application date: Oct, 7, 2011. Hereinafter, referred to as "Original Application"), the application concerning the Patent was filed (Japanese Patent Application No. 2013-141658)
Aug. 9, 2013 Establishment of the patent right

Nov. 6, 2013 Issuance of publication of examined patent application (Japanese Patent publication No. 5337323)

Nov. 6, 2013 Demand for trial for patent invalidation (invalidation No. 2013-800210) (hereinafter, referred to as "the First Trial")

Aug. 4, 2014 Submission of a written correction request (hereinafter, the correction according to the written correction request is referred to as "the First Correction")

Dec. 8, 2014 Appeal decision with the conclusion "The correction request shall be approved as request. The appeal of the case was groundless."

Feb. 12, 2015 Trial demand of the case

Apr. 27, 2015 Submission of a written reply

Jun. 18, 2015 Notification of matters to be examined

Jul. 17, 2015 Submission of an oral proceedings statement brief (Demandant)

Jul. 17, 2015 Submission of an oral proceedings statement brief (Demandee)

Jul. 31, 2015 Submission of an oral proceedings statement brief (2) (Demandant)

Jul. 31, 2015 Submission of an oral proceedings statement brief (2) (Demandee)

Jul. 31, 2015 Oral proceeding

Aug. 27, 2015 Submission of a written statement (Demandant)

No. 2 Inventions according to claims 1 to 7 of the Patent

The inventions according to claims 1 to 7 of the Patent (hereinafter, referred to as "Patent Invention 1" and the like) are acknowledged as described in each of claims 1 to 7 of the scope of claims of the corrected description affixed to the above-mentioned written correction request dated Aug. 4, 2014 as follows, because the appeal decision that approved the First Correction has become final and conclusive as shown in the history of the procedures of the above-mentioned No. 1.

"[Claim 1]

A position detecting apparatus for detecting a position of an outputting member in a hydraulic cylinder having a cylinder body, the outputting member mounted in the cylinder body in a manner capable of moving forward and backward, and a hydraulic chamber for driving the outputting member toward at least one of a moving-forward side and a moving-backward side, the position detecting apparatus comprising:

an air passage formed within the cylinder body, the air passage having one end supplied with pressurized air and another end in communication with the outside world; and an opening/closing valve mechanism capable of performing opening and closing of the air passage, wherein

the opening/closing valve mechanism comprises: a valve body mounted in a mounting hole formed in the cylinder body in a manner capable of moving forward and backward; an oil pressure introducing chamber configured to hold the valve body in an advanced state to a side of the outputting member by an oil pressure of the hydraulic chamber; and an oil pressure introducing passage to make the hydraulic chamber and the oil pressure introducing chamber communicate with each other, and wherein,

when the outputting member reaches a predetermined position, the valve body is moved by the outputting member to switch an open/close state of the opening/closing valve mechanism, enabling detection of arrival of the outputting member to the predetermined position through an air pressure of the air passage.

[Claim 2]

The position detecting apparatus according to claim 1, wherein,

in a state that oil pressure is supplied to the hydraulic chamber and the outputting member is not in the predetermined position, the opening/closing valve mechanism maintains a valve-opened state to open the air passage to the outside world, wherein

when oil pressure of the hydraulic chamber is switched to drain pressure and the outputting member reaches the predetermined position, the opening/closing valve mechanism is made to switch to a valve-closed state to close the air passage, raising pressure of the air passage located at the one end side relative to the opening/closing valve mechanism by the switching, and, based on the pressure rising beyond a set pressure, the presence of outputting member in the predetermined position is detected, and wherein,

when the outputting member starts to move from the predetermined position, the opening/closing valve mechanism is made to switch to the valve-opened state to open the air passage to the outside world, and, by the switching, pressure of the air passage located at the one end side relative to the opening/closing valve mechanism is made to be lowered.

[Claim 3]

The position detecting apparatus according to claim 2, wherein the opening/closing valve mechanism comprises a cap member that is made to be inserted to and screwed with the mounting hole formed in the cylinder body, and to which the valve body is inserted in a manner capable of moving forward and backward, and wherein

a part of the air passage is formed in the cap member, and the oil pressure introducing chamber is formed between the cap member and the valve body.

[Claim 4]

The position detecting apparatus according to claim 2, wherein the oil pressure introducing passage in the opening/closing valve mechanism is formed in a neighborhood portion of a shaft center of the valve body in a penetrating through manner and in a manner being parallel to a mounting direction of the valve body.

[Claim 5]

The position detecting apparatus according to claim 2, wherein the valve body is provided in a manner capable of moving forward and backward in a direction orthogonal to a forward and backward direction of the outputting member.

[Claim 6]

The position detecting apparatus according to claim 2, wherein the valve body is provided in a manner capable of moving forward and backward in a forward and backward direction of the outputting member.

[Claim 7]

The position detecting apparatus according to claim 2, wherein the predetermined position is either one of positions of a rising limitation position and a descending limitation position of the outputting member."

No. 3 Allegations by the parties concerned

(Hereinafter, Evidence A No. n and Evidence B No. n are respectively referred to as "An" and "Bn," and an invention or a matter described in Evidence A No. n or Evidence B No. n alleged by a party concerned is referred to as "An-described invention," "An-described matters," or the like. In addition, when a described portion is specified by a line number, a blank line will not be counted.)

1. The object and reason of the demand alleged by the demandant

According to the written demand for trial (hereinafter, referred to as "Written Demand"), the oral proceedings statement brief dated Jul. 17, 2015 (hereinafter, referred to as "Demandant Brief"), the oral proceedings statement brief (2) dated Jul. 31, 2015 (hereinafter, referred to as "Demandant Brief (2)"), and the written statement dated Aug. 27, 2015 (hereinafter, referred to as "Demandant Written Statement"), the object of the demand alleged by the demandant is to require a trial decision that the patents as to the Patent Inventions 1 to 7 shall be invalidated, and the outline of the reasons for invalidation 1 to 4 is as follows.

Reasons for invalidation 1 to 3 are roughly that the Demandee cannot obtain a patent for the Patent Inventions 1 to 7 in accordance with the provisions of Article 29-2 of the Patent Act, because they could have been invented by a person skilled in the art easily based on the inventions and matters according to A1 to A9 and the conventionally well-known matters, and, therefore, the Patent falls under the category of Article 123(1)(ii) of the Patent Act, and it should be invalidated.

The reason for invalidation 4 is that, although the patent application concerning the Patent (hereinafter, referred to as "Application of the case") is one making, as has been described in the history of the procedures in No. 1, a part of the Original Application be a new patent application, the Application of the case is an application to which a new technology matter that has not explained in the description of the Original Application is added, and, therefore, it violates the prescriptions of Article 44 of the Patent Act, and, consequently, the application date of the Application of the case is its actual application date, and not the application date of the Original Application. And that, accordingly, the Patent Inventions 1 to 7 fall under the category of Article 123(1)(ii) of the Patent Act and should be invalidated, because these are inventions described in Japanese Unexamined Patent Application Publication No. 2013-82025 that is a publication distributed before the application date of the Application of the case and is a publication concerning the Original Application, and, therefore, the Demandee is not capable of obtaining a patent in accordance with the provisions of Article 29(1)(iii) of the Patent Act.

The allegation of the Demandant for each of the reasons for invalidation 1 to 4 is summarized as follows.

(1) Regarding the reason for invalidation 1

A. Regarding the Patent Invention 1

When the Patent Invention 1 and A1-described invention are compared, they are different in the following different features 1-1 to 1-3, and are identical in the remaining features.

Different feature 1-1: A point that the Patent Invention 1 is of a "position detecting apparatus," whereas a pilot valve B of the A1-described invention is an opening/closing valve mechanism that is actuated when the piston rod reaches a predetermined position (the end of its retracted stroke), and it is not clearly stated that it is a "position detecting apparatus."

Different feature 1-2: A point that an air passage of the Patent Invention 1 is formed within a cylinder body, whereas an air passage of the A1-described invention is formed in a cap member, but is not formed within a cylinder body.

Different feature 1-3: A point that, in the Patent Invention 1, "a valve body is moved forward only by the oil pressure of a hydraulic chamber," whereas, in the A1-described invention, "a valve body is moved forward by the oil pressure of a hydraulic chamber and spring force" (Written Demand, page 20, line 6 to page 21, line 11 from the bottom).

The different feature 1-1 will now be discussed below. It would have been easily arrived at by a person skilled in the art to apply a "position sensor" described in A2 or a "sensing device" described in A4 to the A1-described invention, thereby making the A1-described invention include the configuration concerning the different feature 1-1. (Written Demand, page 21, line 7 from the bottom to the last line of page 24).

Furthermore, from the matters described in A4, A13, and A18, it would have been easily arrived at by a person skilled in the art to utilize the A1-described invention as a position detecting apparatus; that is, to provide the configuration concerning the different feature 1-1 in the A1-described invention. (Demandant Written Statement, page 3, line 5 to page 6, line 9 from the bottom).

The different features 1-2 will now be discussed below. In A2, A3, A5, and A6, there is described that an air passage is formed within a cylinder body or in a valve case. Therefore, it would have been easily arrived at by a person skilled in the art to apply the described matters of A2, A3, A5, or A6 to the A1-described invention, which is common in use application to those and has a common switch structure to those, to make the A1-described invention include the matters concerning the different feature 1-2. Furthermore, besides A2, A3, A5, and A6, it is the well-known art that a valve case that houses a valve body is embedded in a cylinder body, and, at what position an air passage should be placed is a matter determined accordingly, and also there is no reason at all to inhibit forming it in a cylinder body. It is a matter that a person skilled in the art can set accordingly to form an air passage in a cylinder body in the A1-described invention. (Written Demand, page 25, line 1 to page 30, line 9).

The different features 1-3 will now be discussed below. It would have been easily arrived at by a person skilled in the art to apply "a differential pressure piston as shown in Fig. 11" described in A3, "a valve member 62" described in A5, or "a slide valve 42" described in A6 to the A1-described invention. (Written Demand, page 30, line 6 from the bottom to page 34, line 1)

Even if the Patent Invention 1 is one that makes a valve body move forward by "only oil pressure of a hydraulic chamber," it would have been easily arrived at by a

person skilled in the art to apply the described matter of A3, A5, or A6 to the A1-described invention. (Demandant Brief, page 10, line 10 to page 12, line 2).

As mentioned above, all of the different features 1-1 to 1-3 would have been easily arrived at by a person skilled in the art based on the matters described in A2 to A6, and, therefore, in the Patent Invention 1, there exists a reason for invalidation in that Article 29-2 of the Patent Act is violated. (Written Demand, page 34, lines 2 to 6).

Also, although there is no clear statement in A1 that the control fluid of the pilot valve B is "pressurized air," there is a statement that "(a pilot valve) lacked proper provision for lubricating internal parts" (column 1, lines 26 to 31), a person skilled in the art understands that the control fluid of the pilot valve B is "pressurized air" naturally. (Written Demand, page 16, lines 9 to 5 from the bottom).

Even if it is not clear whether the control fluid of the pilot valve B is "pressurized air," it is easy to apply "a pneumatic pilot valve" described in A2 or "a control valve" described in A4, in which the control fluid is pressurized air, to the A1-described invention. (Demandant Brief, page 7, line 11 from the bottom to page 10, line 5).

B. Regarding the Patent Invention 2

When the Patent Invention 2 and the A1-described invention are compared, the different features are the aforementioned different features 1-1 to 1-3, and they are identical in the remaining features. The different features 1-1 to 1-3 are ones that would have been easily arrived at by a person skilled in the art based on the described matters of A2 to A6 as indicated in the above-mentioned A, and, therefore, there exists in the Patent Invention 2 a reason for invalidation that Article 29-2 of the Patent Act is violated. (Written Demand, page 34, lines 7 to 16).

C. Regarding the Patent Invention 3

When the Patent Invention 3 and the A1-described invention are compared, they are different in the following different feature 1-4 in addition to the aforementioned different features 1-1 to 1-3, and they are identical in the remaining features.

Different feature 1-4: A point that a cap member of the Patent Invention 3 as a valve case of an opening/closing valve mechanism is made to be inserted to and be screwed with the mounting hole formed in a cylinder body, whereas a valve body (valve case) 21 of an opening/closing valve mechanism of the A1-described invention is secured by bolts in a state inserted into a mounting hole formed in the cylinder body. (Written Demand, page 34, line 7 from the bottom to page 35, line 5).

The different feature 1-4 will now be discussed below. In A2, there is a statement of "a plug 74 which is turned into a threaded bore 76," and, in A6, there is a statement that "A hexagon shaped plug 44, threadably inserted into the cylindrical housing 22." It would have been easily arrived at by a person skilled in the art to apply the described matter of A2 or A6 in question to the A1-described invention, thereby making the A1-described invention include the configuration concerning the aforementioned different feature 1-4. (Written Demand, page 36, line 6 to page 37, line 4 from the bottom).

As indicated in the above-mentioned A, all the aforementioned different features 1-1 to 1-3 are ones that would have been easily arrived at by a person skilled in the art based on the described matters of A2 to A6. In addition to this, the different feature 1-4 is one that would have been easily arrived at by a person skilled in the art based on the described matter of A2 or A 6, and, thus, there exists in the Patent Invention 3 a reason for invalidation, in that Article 29-2 of the Patent Act is violated. (Written Demand, page 37, lines 1 to 7).

D. Regarding the Patent Invention 4

When the Patent Invention 4 and the A1-described invention are compared, different features between them are the aforementioned different features 1-1 to 1-3, and they are identical in the remaining features. As indicated in the above-mentioned A, the different features 1-1 to 1-3 are ones that would have been easily arrived at by a person skilled in the art based on the described matters of A2 to A6, and, therefore, in the Patent Invention 4, there exists a reason for invalidation, in that Article 29-2 of the Patent Act is violated. (Written Demand, page 37, line 8 to page 38, line 2)

E. Regarding the Patent Invention 5

When the Patent Invention 5 and the A1-described invention are compared, different features between them are the aforementioned different features 1-1 to 1-3, and they are identical in the remaining features. As indicated in the above-mentioned A., the different features 1-1 to 1-3 are ones that would have been easily arrived at by a person skilled in the art based on the matters described in A2 to A6, and, therefore, there exist in the Patent Invention 5 a reason for invalidation, in that Article 29-2 of the Patent Act is violated. (Written Demand, page 38, lines 3 to 12)

F. Regarding the Patent Invention 6

When the Patent Invention 6 and the A1-described invention are compared, they are different in the following different feature 1-5 in addition to the aforementioned different features 1-1 to 1-3, and they are identical in the remaining features.

Different feature 1-5: A point that, in the Patent Invention 6, a valve body is provided in a manner capable of moving forward and backward in a direction of the moving forward and backward direction of an outputting member, whereas, in the A1-described invention, it is provided in a manner capable of moving forward and backward in a direction orthogonal to the direction of moving forward and backward direction of an outputting member. (Written Demand, page 38, lines 13 to 18).

The different feature 1-5 will now be discussed below. In each of A2, A3, A5, and A6, there is described a point that a configuration corresponding to a "valve body" (an operator 44 and a valve member 46 of A2, pilot valves 63 and 64 of A3, a valve member 62 of A5, and a slide valve 42 of A6), is provided in a manner capable of moving forward and backward in the forward and backward direction of a configuration corresponding to an "outputting member" (a piston 24 of A2, a work piston 21 of A3, a piston 34 of A5, an actuator piston 32 of A6). Accordingly, it would have been easily arrived at by a person skilled in the art to make, by applying the matters in question described in A2, A3, A5, or A6 to the A1-described invention,

the A1-described invention to include the configuration concerning the aforementioned different feature 1-5. (Written Demand, page 38, line 5 from the bottom to the last line of page 41)

In addition, whether to provide a valve body in a manner capable of moving forward and backward in the forward and backward direction of an outputting member or in a direction orthogonal to the forward and backward direction the outputting member is a matter to be determined accordingly according to a positional relationship between the opening/closing valve mechanism and the outputting member, and there is no obstructive reason existing at all. Therefore, it is just a matter capable of being designed by a person skilled in the art accordingly. (Written Demand, page 42, lines 1 to 5).

As mentioned above, all the different features 1-1 to 1-3 and 1-5 are ones that would have been easily arrived at by a person skilled in the art based on the matters respectively described in A2 to A6, and, therefore, in the Patent Invention 6, there exists a reason for invalidation, in that Article 29-2 of the Patent Act is violated. (Written Demand, page 42, lines 10 to 13).

G. Regarding the Patent Invention 7

When the Patent Invention 7 and the A1-described invention are compared, they are different in the following different feature 1-6 in addition to the aforementioned different features 1-1 to 1-3, and they are identical in the remaining features.

Different feature 1-6: A point that, in the Patent Invention 7, a "predetermined position" of an outputting member detected by an opening/closing valve mechanism is "any one of positions of a rising limitation position and a descending limitation position," whereas, in the A1-described invention, it is a limitation position of an outputting member in the horizontal direction. (Written Demand, page 42, lines 8 to 3 from the bottom).

The different feature 1-6 will now be discussed below. The different feature 1-6 is, in the end, just a difference of whether a piston is arranged in a manner to move in the vertical direction or in a manner to move in the horizontal direction. As illustrated in A7, A8, and the like, in inventions related to a device to detect the position of a piston, there are many examples that arrange a piston in the vertical direction. Also, there is no obstructive reason at all in making a piston that moves in the horizontal direction move in the vertical direction. Accordingly, the different feature 1-6 is a design matter that a person skilled in the art can set accordingly, and it would have been easily arrived at. (Written Demand, page 43, lines 3 to 12).

Even if it is such that the different feature 1-6 is not a design matter, detection of "a clamped state" and "an unclamped state" described in A7 is to check that a clamping device is in the rising limitation position and the descending limitation position, and to "detect that a rod 62 is in a not-clamping position M" described in A8 is to check that a clamping device is in the descending limitation position. Then, it would have been easily arrived at by a person skilled in the art to apply the matters described in the above-mentioned A7 or A8 to the A1-described invention. (Written Demand, page 43, line 13 to page 46, line 1).

As mentioned above, the different feature 1-6 is a design matter that can be selected accordingly by a person skilled in the art, or it would have been easily arrived at by a person skilled in the art by applying the technology matter stated in A7 or A8. Accordingly, in the Patent Invention 7, there exists a reason for invalidation, in that Article 29-2 of the Patent Act is violated. (Written Demand, page 46, lines 2 to 9).

(2) Regarding the reason for invalidation 2

A. Regarding the Patent Invention 1

When the Patent Invention 1 and the A2-described invention are compared, they are different in the following different feature 2-1, and they are identical in the remaining features.

Different feature 2-1: A point that, in an opening/closing valve mechanism of the Patent Invention 1, an oil pressure introducing chamber and an oil pressure introducing passage to make a hydraulic chamber and the oil pressure introducing chamber communicate with each other are provided, and a state that a valve body has been made to be advanced to the side of an outputting member is kept by oil pressure of a hydraulic chamber, whereas a pilot valve 16 of the A2-described invention keeps the advanced state by spring force and air pressure within an air passage. (Written Demand, page 50, line 6 from the bottom to page 51, line 8).

The different feature 2-1 will now be discussed below. Both of "a valve body" described in A1 and "a valve body" described in A3 are ones that are made to move forward by oil pressure of a hydraulic cylinder. It would have been easily arrived at by a person skilled in the art to make the A2-described invention include the configuration concerning the different feature 2-1 by applying the matters described in A1 or A3 to the A2-described invention. (Written Demand, page 51, line 9 to page 53, line 3).

When the A3 invention is applied to the A2 invention, an oil pressure introducing hole described in A3 is provided in the valve member 46 of the A2 invention, and, as is described in A3 as substitution is available accordingly, an oil pressure introducing chamber should be simply provided instead of a biasing spring 50. (Demandant Brief, page 19, lines 7 to 10).

As mentioned above, the different feature 2-1 is one that would have been easily arrived at by a person skilled in the art by applying the matters described in A1 or A3, and, therefore, there exists a reason for invalidation, in that Article 29-2 of the Patent Act is violated in the Patent Invention 2. (Written Demand, page 53, lines 4 to 7).

In the A2 invention, although there exist three air passages of "an air passage supplied with pressurized air (a conduit 58)," "an air passage in communication with the outside world (an exhaust conduit 64)," and "an air passage (a conduit 56)" selectively opened and closed to those two by an opening/closing valve mechanism, they are identical with "an air passage having one end supplied with pressurized air and another end in communication with the outside world; and an opening/closing valve mechanism capable of performing opening and closing of the air passage" of the Patent Invention 1, because "an air passage supplied with pressurized air," "an air

passage in communication with the outside world," and a pneumatic valve 16 to open and close the passages exist. (Demandant Brief, page 13, lines 8 to 23).

Even if it is a different feature that, in the Patent Invention 1, an air passage supplied with pressurized air and an air passage in communication with the outside world are "communicated" with each other by opening and closing of the opening/closing valve mechanism, whereas, in the A2-described invention, an air passage (the conduit 58) supplies pressurized air and an air passage (the conduit 64) in communication with the outside world do not "communicate" with each other, it is conventionally well-known to make an air passage supplied with pressurized air and an air passage in communication with the outside world to be "communicated" with each other, from the statements of A3, and A12 to 14. (Demandant Brief, page 14, line 2 to page 18, line 6).

B. Regarding the Patent Invention 2

When the Patent Invention 2 and the A1-described invention are compared, a different feature between them is the aforementioned different feature 2-1, and they are identical in the remaining features. As indicated in the above-mentioned A, the different feature 2-1 would have been easily arrived at by a person skilled in the art based on the matters described in A1 or A3, and, therefore, there exists a reason for invalidation, in that Article 29-2 of the Patent Act is violated in the Patent Invention 2. (Written Demand, page 53, lines 8 to 17).

C. Regarding the Patent Invention 3

When the Patent Invention 3 and the A2-described invention are compared, they are different in the following different features 2-2 and 2-3 in addition to the aforementioned different feature 2-1, and they are identical in the remaining features.

Different features 2-2: A point that a valve case of the Patent Invention 3 as an accommodation member of a valve body has a cap member made to be inserted into and screwed with a mounting hole formed in a cylinder body, and a part of an air passage is formed in that cap member, whereas a valve case of the A2-described invention has a cyclic sleeve 84 inserted into a mounting hole formed in the cylinder body, and a plug 74a made to be screwed with the mounting hole, and a part of the air passage is formed in the above-mentioned cyclic sleeve 84.

Different feature 2-3: A point that an oil pressure introducing chamber is formed between the cap member and the valve body of the valve case of the Patent Invention 3, whereas, in a valve case of the A2-described invention (the cyclic sleeve 84 and the plug 74a), an oil pressure introducing chamber is not formed (Written Demand, page 53, line 19 to page 54, line 13).

The different feature 2-2 will now be discussed below. In what portion of a valve case composed of the cyclic sleeve 84 and the plug 74a an air passage should be formed is just a design matter that can be selected by a person skilled in the art. In addition, there are respectively described a valve case (the valve body 21) in A1, a valve case made to be inserted into and screwed with a mounting hole formed in a cylinder body in A6, and a housing part (valve case) 6' in which a part of a fluid path is formed in A9, and, therefore, the different features 2-2 would also be achieved by a person skilled in the art with ease by applying the matters described in the above-

mentioned A1, A6, or A9 to the A2-described invention. (Written Demand, page 54, line 14 to page 58, line 3).

The different feature 2-3 will now be discussed below. The different feature 2-3 is a different feature substantially identical to the aforementioned different feature 2-1, and, therefore, as indicated in the above-mentioned A, it would have been easily arrived at by a person skilled in the art by applying the described matters of A1 or A3. (Written Demand, page 58, lines 4 to 17).

As mentioned above, the Patent Invention 3 is an invention that would have been conceived of by a person skilled in the art with ease by applying the matters described in A1, A3, A6, or A9 to the A2-described invention, and, thus, there exists a reason for invalidation, in that Article 29-2 of the Patent Act is violated. (Written Demand, page 58, lines 18 to 21).

D. Regarding the Patent Invention 4

When the Patent Invention 4 and the A2-described invention are compared, they are different in the following different feature 2-4 in addition to the aforementioned different feature 2-1, and they are identical in the remaining features.

Different feature 2-4: A point that, in the Patent Invention 4, an oil pressure introducing passage formed in a neighborhood portion of the shaft center of a valve body in a penetrating through manner and in a manner being parallel to the mounting direction of the valve body is formed, whereas, in the A2-described invention, there is no oil pressure introducing passage. (Written Demand, page 58, the last line to page 59, line 5)

The different feature 2-4 will now be discussed below. As indicated in the above-mentioned A, although it would have been easily arrived at by a person skilled in the art to make the A2-described invention be provided with the configuration concerning the different feature 2-1, if this configuration is provided; that is, if, in a valve body of the A2-described invention, an oil pressure introducing passage described in A1 or A3 is formed, the oil pressure introducing passage will be formed in a neighborhood portion of a shaft center of the valve body in a penetrating through manner and in a manner being parallel to a mounting direction of the valve body. Accordingly, it would have been easily arrived at by a person skilled in the art to provide the configuration concerning the different feature 2-4 in the A2-described invention, by applying the matters described in A1 or A3. (Written Demand, page 59, lines 6 to 18).

E. Regarding the Patent Invention 5

When the Patent Invention 5 and the A2-described invention are compared, they are different in the following different feature 2-5 in addition to the aforementioned different feature 2-1, and they are identical in the remaining features.

Different feature 2-5: A point that, in the Patent Invention 5, a valve body is provided in a manner capable of moving forward and backward in a direction orthogonal to the forward and backward direction of an outputting member, whereas, in the A2-described invention, it is provided in a manner capable of moving forward and backward in the forward and backward direction of the outputting member. (Written Demand, page 59, line 4 from the bottom to page 60, line 4).

The different feature 2-5 will now be discussed below. There are respectively described, in A1, a point that the forward and backward directions of a spool valve (valve body) 29 and a piston rod 16 are orthogonal to each other, and, in A4, a point that the forward and backward directions of a plunger 126 of a switch 100 and a piston 30 are orthogonal to each other, and, therefore, it would have been easily arrived at by a person skilled in the art to make the A2-described invention be provided with the configuration concerning the aforementioned different feature 2-5 based on the matters described in A1 or A4. Furthermore, whether to provide a valve body in a manner capable of moving forward and backward in the forward and backward direction of the outputting member or to provide it in a manner capable of moving forward and backward in a direction orthogonal to the forward and backward direction of the outputting member is a matter that should just be determined according to the positional relationship between the opening/closing valve mechanism and the outputting member, and, therefore, the configuration concerning the different feature 2-5 is just a design-related matter. (Written Demand, page 60, line 5 to page 61, line 15).

Accordingly, there is a reason for invalidation, in that the provisions of Article 29-2 of the Patent Act are violated in the Patent Invention 5, because the Patent Invention 5 is one that could have been invented by a person skilled in the art with ease by applying the matters described in A1 or A4 to the A2-described invention, or is one that could have been invented by a person skilled in the art with ease by applying the above-mentioned design-related matter to the A2-described invention. (Written Demand, page 60, lines 16 to 20).

F. Regarding the Patent Invention 6

When the Patent Invention 6 and the A2-described invention are compared, they are different in only the aforementioned different feature 2-1, and they are identical in the remaining features.

As indicated in the above-mentioned A, it would have been easily arrived at by a person skilled in the art to make the A2-described invention be provided with the configuration concerning the different feature 2-1 by applying the matters described in A1 or A3.

Accordingly, in the Patent Invention 6, there is a reason for invalidation, in that the provisions of Article 29-2 of the Patent Act are violated. (Written Demand, page 61, line 4 from the bottom to page 62, line 5).

G. Regarding the Patent Invention 7

When the Patent Invention 7 and the A2-described invention are compared, they are different in the following different feature 2-6 in addition to the aforementioned different feature 2-1, and they are identical in the remaining features.

Different feature 2-6: A point that, in the Patent Invention 7, a "predetermined position" of an outputting member detected by an opening/closing valve mechanism is "any one of positions of a rising limitation position and a descending limitation position," whereas, in the A2 invention, it is a limitation position of an outputting member in the horizontal direction (Written Demand, page 62, lines 7 to 12).

The different feature 2-6 will now be discussed below. In inventions related to a device for detecting a position of a piston, there are a lot of examples in which a piston is arranged in the vertical direction as described in A7, A8, and the like, and, in addition, there is no obstructive reason for doing so, and, thus, the matter concerning the different feature 2-6 is a design-related matter that can be selected by a person skilled in the art accordingly. In addition, as indicated in the above-mentioned (1) G, detection of a "clamped state" and an "unclamped state" described in A7 is to check that a clamping device is at the rising limitation position and the descending limitation position, and to "detect that a rod 62 is in a not-clamping position M" described in A8 is to check that a clamping device is in the descending limitation position, and, thus, it would have been easily arrived at by a person skilled in the art to provide the A2-described invention with the configuration concerning the different feature 2-6 by applying the matters described in the above-mentioned A7 or A8. (Written Demand, page 62, line 13 to page 64, line 7).

Accordingly, the Patent Invention 7 is one that could have been invented by a person skilled in the art with ease by applying the above-mentioned design-related matter to the A2-described invention, or is one that could have been invented by a person skilled in the art with ease by applying the matters described in the above-mentioned A7 or A8 to the A2-described invention, and, therefore, there is a reason for invalidation, in that the provisions of Article 29-2 of the Patent Act are violated. (Written Demand, page 64, lines 9 to 15).

(3) The reason for invalidation 3

A. Regarding the Patent Invention 1

When the Patent Invention 1 and the A3-described invention are compared, they are different in the following different features 3-1 and 3-2, and they are identical in the remaining features.

Different feature 3-1: A point that the Patent Invention 1 is of a "position detecting apparatus," whereas, a valve body of the A3-described invention is an opening/closing valve mechanism that is actuated when the piston rod reaches a predetermined position (the end of its retracted stroke), and it is not clearly described that it is a "position detecting apparatus" in A3.

Different feature 3-2: A point that, in the A3-described invention, in a case where a piston is made to be driven by oil pressure, the control fluid of a device that performs a reverse operation (the pressurization fluid to be supplied to a flow path 61 as a control pipe) is "pressurized oil," whereas, in the Patent Invention 1, a piston is made to be driven by oil pressure, and control fluid of a position detecting apparatus is made to be "pressurized air" (Written Demand, page 68, line 5 from the bottom to page 69, line 13).

The different feature 3-1 will now be discussed below. In A2, there is described a position sensor for detecting a stroke end of the stroke of a piston 24, the sensor being configured to be able to confirm that the piston 24 has moved to a desired position. In A4, there is described a "plunger-type switch 100" that checks that a piston 30 has moved to a desired position, and the plunger-type switch 100 is a detection device that checks that the piston 30 has moved to a desired position according to whether or not a plurality of air ports come to be in communication with

each other by a plunger 126 made to protrude into a cylinder. Therefore, it would have been easily arrived at by a person skilled in the art to make the A3-described invention include the configuration concerning the different feature 3-1 by applying the matters described in A2 or A4. (Written Demand, page 69, line 14 to page 71, line 14).

The A3-described invention is an invention in which an operation of a piston is made to be reversed when "the piston has reached <<the end positions>>," and, thus, the A3-described invention is a complex invention made up of "a position detection function of a piston" and "a reversing function of a piston operation," and "pilot valves 63 and 64" of the A3-described invention function also as "a piston position detecting apparatus." (Demandant Written Statement, page 7, line 1 to line 2 from the bottom).

The different feature 3-2 will now be discussed below. In A1, there is described a position sensor provided with an air passage having one end supplied with pressurized air and another end in communication with the outside world, and an opening/closing valve mechanism capable of performing opening and closing of the air passage in order to detect a stroke end of a piston 10 of a hydraulic cylinder. In A4, there is described the configuration of FIG. 3 as an opening/closing valve mechanism, and there is also stated that "Referring now to FIG. 3, there is illustrated the plunger-type switch 100. The switch 100 is adapted to utilize an air valve sensor." (column 5, lines 11 to 13), and, therefore, there is described a configuration in which the control fluid of a position detecting apparatus is "pressurized air" while the piston is of oil pressure driven type. Accordingly, it would have been easily arrived at by a person skilled in the art to provide the configuration concerning the different feature 3-2 in the A3-described invention by applying the described matters of A1 or A4. (Written Demand, page 71, line 15 to page 73, line 3).

In addition, regarding the driving fluid and the control fluid of a piston, it is clearly stated in A2 and A4 as mentioned above that different pressurization fluids are supplied from different supply sources, and, to do so is just the well-known art disclosed also in A12 and the like. (Demandant Brief, page 21, lines 6 to 4 from the bottom).

Moreover, regarding an "oil pressure four-way valve" for making a hydraulic cylinder make reciprocate automatically, it is common general technical knowledge that "an oil pressure four-way valve operated by air pressure" can be used as is described in A17. (Demandant Brief (2), page 6, lines 9 to 5 from the bottom).

Accordingly, the Patent Invention 1 is one that could have been invented by a person skilled in the art with ease based on the A3-described invention and the matters described in A1, A2, and A4, and, thus, there is a reason for invalidation, in that the prescriptions of Article 29-2 of the Patent Act are violated. (Written Demand, page 73, lines 4 to 7).

B. Regarding the Patent Invention 2

When the Patent Invention 2 and the A3-described invention are compared, they are different in the following different feature 3-3 in addition to the aforementioned different features 3-1 and 3-2, and they are identical in the remaining features.

Different feature 3-3: A point that, in the Patent Invention 2, in a state that an outputting member is not at a predetermined position, the flow path of an

opening/closing valve mechanism maintains the valve-opened state, becomes the valve-closed state when it reaches a predetermined position, and, by the pressure rising beyond a set pressure, it is detected that the outputting member is at the predetermined position, whereas, in the A3-described invention, in a state where an outputting member is not at a predetermined position, the flow path of an opening/closing valve mechanism maintains the valve-closed state, becomes the valve-opened state when it reaches a predetermined position, and, by the pressure decreasing below a set pressure, it is detected that the outputting member is at the predetermined position. (Written Demand, page 73, lines 9 to 17).

The different feature 3-3 will now be discussed below. In an opening/closing valve mechanism, it is just a design matter that can be selected by a person skilled in the art accordingly whether, in a state that external force (pressing force by an outputting member) is not applied to a valve body, to make it be the valve-closed state or to make it be the valve-opened state. In addition, the configuration in which the valve-opened state is maintained in a state that external force (pressing force by an outputting member) is not applied to a valve body as is the case with the Patent Invention 3 is described in the explanatory portion of Fig. 1 of A1, Fig. 3 of A2, Fig. 1 and Fig. 4 of A7, and Fig. 10 and Fig. 11 of A10, and, thus, it is a well-known art in the technical field of the case. Moreover, an opening/closing valve mechanism described in A1 is a mechanism in which, in a state that an outputting member is not at a predetermined position, the flow path of the opening/closing valve mechanism maintains the valve-opened state, becomes the valve-closed state when it reaches a predetermined position, and it is detected that the outputting member is at the predetermined position by the pressure rising beyond a set pressure. Then, it would have been easily arrived at by a person skilled in the art to provide the configuration concerning the aforementioned different feature 3-3 in the A3-described invention, by applying the above-mentioned design-related matter, or by applying the above-mentioned conventionally well-known matter, or by applying the matters described in the above-mentioned A1. (Written Demand, page 73, line 7 from the bottom to page 74, line 8 from the bottom).

Accordingly, the Patent Invention 2 is one that could have been invented by a person skilled in the art with ease based on the A3-described invention, the matters described in A1, A2, and A4, and the conventionally well-known matters, and, therefore, there exists a reason for invalidation, in that Article 29-2 of the Patent Act is violated. (Written Demand, page 74, line 7 from the bottom to the last line).

C. Regarding the Patent Invention 3

When the Patent Invention 3 and the A3-described invention are compared, they are different in the following 3-4 in addition to the aforementioned different features 3-1 to 3-3.

Different feature 3-4: A point that, in the Patent Invention 3, a valve case (cap member) as a member for accommodating a valve body is made to be inserted into and screwed with a mounting hole formed in a cylinder body, and a part of air passage is formed in the cap member, whereas, in the A3-described invention, a valve case is integrated with the cylinder body. (Written Demand, page 75, lines 2 to 9).

The different feature 3-4 will be discussed below. In A6, there is described a technical matter that a valve case forming a flow path is made to be inserted into and screwed with a mounting hole formed in a cylinder body. Accordingly, it would have been easily arrived at by a person skilled in the art to provide the configuration concerning the different feature 3-4 in the A3-described invention by applying the matters described in the above-mentioned A6. (Written Demand, page 75, line 10 to page 76, line 7).

Therefore, the Patent Invention 3 is one that could have been invented by a person skilled in the art with ease based on the A3-described invention, the matters described in A1, A2, A4, and A6, and the matters that are conventionally well-known, and, thus, there exists a reason for invalidation, in that Article 29-2 of the Patent Act is violated. (Written Demand, page 76, lines 8 to 14).

D. Regarding the Patent Invention 4

When the Patent Invention 4 and the A3-described invention are compared, they are different in the aforementioned different features 3-1 to 3-3, and they are identical in the remaining features. Then, as indicated in the above-mentioned A and B, it would have been easily arrived at by a person skilled in the art to include the configurations concerning these different features in the A3-described invention.

Accordingly, the Patent Invention 4 is one that could have been invented by a person skilled in the art with ease based on the A3-described invention, the matters described in A1, A2, and A4, and the matters that are conventionally well-known, and, thus, there exists a reason for invalidation, in that Article 29-2 of the Patent Act is violated. (Written Demand, page 76, line 15 to page 77, line 1).

E. Regarding the Patent Invention 5

When the Patent Invention 5 and the A3-described invention are compared, they are different in the following different feature 3-5 in addition to the aforementioned different features 3-1 to 3-3, and they are identical in the remaining features.

Different feature 3-5: A point that, in the Patent Invention 5, a valve body is provided in a manner capable of moving forward and backward in a direction orthogonal to the forward and backward direction of an outputting member, whereas, in the A3-described invention, it is provided in a manner capable of moving forward and backward in the forward and backward direction of the outputting member. (Written Demand, page 77, lines 3 to 8).

The different feature 3-5 will now be discussed below. There is described that a spool valve (valve body) 29 described in A1 is provided in a manner capable of moving forward and backward in a direction orthogonal to the forward and backward direction of a piston 10 and a piston rod 16 that are outputting members. In A4, there is described that a plunger 126 of a plunger-type switch 100 that corresponds to a "valve body" is provided in a manner capable of moving forward and backward in a direction orthogonal to the forward and backward direction of the piston 30 that is an outputting member. Accordingly, it would have been easily arrived at by a person skilled in the art to provide the configuration concerning the different feature 3-5 in the A3-described invention by applying the matters described in A1 or A4. In addition,

whether to provide a valve body in a manner capable of moving forward and backward in the forward and backward direction of the outputting member or to provide it in a manner capable of moving forward and backward in a direction orthogonal to the forward and backward direction of the outputting member is also a design-related matter that can be determined accordingly according to the positional relationship between an opening/closing valve mechanism and the outputting member. (Written Demand, page 77, line 9 to page 78, line 3 from the bottom).

Therefore, the Patent Invention 5 is one that could have been invented by a person skilled in the art with ease based on the A3-described invention, A1, A2, and A4, and the matters that are conventionally well-known, and, therefore, there exists a reason for invalidation, in that Article 29-2 of the Patent Act is violated. (Written Demand, page 78, line 3 from the bottom to page 79, line 3).

F. Regarding the Patent Invention 6

When the Patent Invention 6 and the A3-described invention are compared, they are different in the aforementioned different features 3-1 to 3-3, and they are identical in the remaining features. Then, as indicated in the above-mentioned A and B, it would have been easily arrived at by a person skilled in the art to include the configurations concerning these different features in the A3-described invention.

Accordingly, the Patent Invention 6 is one that could have been invented by a person skilled in the art with ease based on the A3-described invention, the matters described in A1, A2, and A4, and the matters that are conventionally well-known, and, thus, there exists a reason for invalidation, in that Article 29-2 of the Patent Act is violated. (Written Demand, page 79, lines 4 to 14).

G. Regarding the Patent Invention 7

When the Patent Invention 7 and the A3-described invention are compared, they are different in the following different feature 3-6 in addition to the aforementioned different features 3-1 to 3-3.

Different feature 3-6: A point that, in the Patent Invention 7, a "predetermined position" of an outputting member detected by an opening/closing valve mechanism is "either one of positions of a rising limitation position and a descending limitation position," whereas, in the A3 invention, it is a limitation position of an outputting member in the horizontal direction. (Written Demand, page 79, lines 8 to 2 from the bottom).

The different feature 3-6 will now be discussed below. In inventions related to a device for detecting a position of a piston, there are a lot of examples in which a piston is arranged in the vertical direction as described in A7, A8, and the like. In addition, there is no obstructive reason at all in changing a piston that moves in the horizontal direction to a piston that moves in the vertical direction. Accordingly, the matter concerning the different feature 3-6 is a design-related matter that can be selected by a person skilled in the art. Furthermore, it would have been easily arrived at by a person skilled in the art to make the A3-described invention include the configuration concerning the different feature 3-6 by applying the matter described in A7 or A8, because there is described in A7 that a clamping device described in A7 is a device to confirm that it is in the clamped state or in the unclamped state (the rising

limitation position, or the descending limitation position) by a pressure change of the pressure fluid, and, as indicated in the above-mentioned (1) G, there is described in A8 that a clamping device described in A8 is a device to confirm that it is at the descending limitation position by a pressure change of the pressure fluid. (Written Demand, page 79, the last line to page 81, line 9 from the bottom).

Accordingly, the Patent Invention 7 is one that could have been invented by a person skilled in the art with ease based on the A3-described invention, the matters described in A1, A2, A4, A7, and A8, and the matters that are conventionally well-known, and, therefore, there exists a reason for invalidation, in that Article 29-2 of the Patent Act is violated. (Written Demand, page 81, line 8 from the bottom to page 82, line 3).

(4) The reason for invalidation 4

A. The matters described in the description of the Original Application

There are the following statements in the description of the Original Application before the division of the Patent (meanwhile, the underlines in this paragraph are given by the Demandant). (Written Demand, page 83, lines 2 to 24).

(A)
"[0004] In a clamping device of patent document 2, a mechanism to perform opening and closing of an air passage in conjunction with ascending and descending motions of the output rod of a fluid pressure cylinder is provided, and the configuration is made in a manner capable of detecting a raised position and a moving down position of the output rod."

(B)
"[Citation List]
[Patent literature]
[0006]
[Patent document 1] Japanese Unexamined Patent Application Publication No. 2001-87991
[Patent document 2] Japanese Unexamined Patent Application Publication No. 2003-305626
[Patent document 3] Japanese Unexamined Patent Application Publication No. 2009-125821"

(C)
"[0008] In a clamping device of patent document 2, a mechanism to detect the raised position and the moving down position of an output rod is provided outside the clamp body. Therefore, as with a clamping device of patent document 1, a detection space is needed to be provided outside the clamp body, and, therefore, the clamping device cannot be constituted compactly. Furthermore, there are some fears of the performance to close an air passage being degraded when it is used for a long time, because it is of a structure that a detection tool to perform opening and closing of an air passage is made to slidably move relative to a detection hole."

(D) "[0010] An object of the present invention is to provide a position detecting apparatus capable of surely detecting that an outputting member has reached a predetermined position through a pressure change of the air pressure of an air passage within a cylinder body, and to provide a position detecting apparatus capable of improving reliability and durability of detecting a predetermined position of an outputting member."

B. The matters described in "patent document 2"

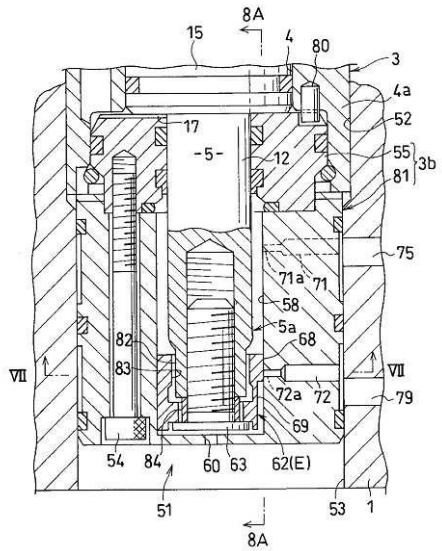
In Japanese Unexamined Patent Application Publication No. 2003-305626 (A8) that is [Patent document 2] described in extracted portion (B) of the above-mentioned A, there is the following description. (Written Demand, page 83, line 3 from the bottom to page 84, line 10).

(A)

"[0004]

[Means for Solving the Problem] In order to achieve the above object, in the invention of claim 1, as shown in Fig. 1 to Fig. 4, or Fig. 5 to Fig. 9, for example, a motion detection device of a clamp has been configured as follows. A clamp rod 5 is inserted into a housing 3 in a manner capable of moving in a shaft center direction; a detection hole 58 is formed in an one-end wall 3b of the housing 3 in a manner having approximately the same shaft center with that of the clamp rod 5; an entrance hole 71 (72) for pressure fluid supply is opened in the peripheral surface of the detection hole 58; a detection tool 62 is made to engage with the detection hole 58 in a manner capable of moving in the shaft center direction; in the outer periphery surface of the detection tool 62, a closing face 68 to close an opening 71a (72a) of the entrance hole 71 (72) and a recess 69 to make the opening 71a (72a) communicate with ambient air are provided; an operation portion 5a is provided on one end of the clamp rod 5; and the operation portion 5a is coupled with the detection tool 62 in a manner capable of relatively moving in the radial direction"

(B) [Fig. 6]



C. The invention disclosed in "patent document 2", and an invention that the description of the Original Application of the Patent excluded

From the statements of the above-mentioned extracted matters A and B, in the description of the Original Application, it is pointed out that the invention described in "patent document 2" has a problem point that "there are some fears of the performance to close an air passage being degraded when it is used for a long time, because it is of a structure that a detection tool to perform opening and closing of an air passage is made to slidably move relative to a detection hole," and, in an effort to solve the problem, the invention according to the Original Application has adopted, as an opening/closing valve mechanism, "a poppet valve" in which a valve body does not slide (a configuration in which a valve body is in contact with a valve seat) and, also in the scope of claims, there has been explicitly stated "... a valve seat capable of being abut by the valve body ...".

However, in the statements of the scope of claims of the description of the Patent at the time of the division in question, the limitation of "a valve seat capable of being abut by the valve body" is not included, and it has become such that a valve which switches opening and closing of a valve mechanism by a valve body sliding into a valve body insertion hole; that is, a so-called "spool valve," is included in its scope of rights. However, a spool valve exactly "is of a structure that a member to perform opening and closing of an air passage (valve body) is made to slidably move relative to a detection hole (valve body insertion hole)," and is of a configuration including the above-mentioned problem point that is supposed to be the problem to be solved in the present invention, and, therefore, the divisional application concerning the Patent is one that takes in an invention clearly excluded in the Original Application, and is one to which a new technical matter that has unexplained in the description of the Original Application is added. (Written Demand, page 84, line 8 from the bottom to page 86, line 9).

D. Propriety of the divisional application and the reason for invalidation 4

When a new application after division adds a new technical matter that is unexplained in the description of the Original Application, it cannot be said that the new application is "within the scope of an invention described in the description of the Original Application," and, thus, it violates the provisions of Article 44 of the Patent Act, and, thus, Article 44(2) of the Patent Act is not applicable. Accordingly, the application date of this patent is the date, Jul. 5, 2013, when the divisional application was carried out in actuality, whereas the Original Application was published on May 9, 2013 (Japanese Unexamined Patent Application Publication No. 2013-82025), and the working examples described in the publication are identical with the working examples of the present patent. Accordingly, the inventions according to claims 1 to 7 of the present patent are identical with those of the inventions according to A11 (Japanese Unexamined Patent Application Publication No. 2013-82025) that was distributed before the application date of the present patent, and, therefore, there is a reason for invalidation, in that Article 29(1)(iii) of the Patent Act is violated. (Written Demand, page 86, lines 10 to 21).

(5) Means of proof of the Demandant

The Demandant has submitted the following A1 to A11 as the means of evidence in the written demand for trial. In addition, in the oral proceedings statement brief dated Jul. 17, 2015, the Demandant submitted A12 to A16. Furthermore, A17 was submitted in the oral proceedings statement brief (2) dated Jul. 31, 2015, and A18 in the Written statement on Aug. 27, 2015.

A1: The description of United States Patent No. 3530896

A2: The description of United States Patent No. 3555966

A3: The description of United Kingdom Patent Application Publication No. 1140216

A4: The description of United States Patent No. 4632018

A5: The description of United States Patent No. 3348803

A6: The description of United States Patent No. 3463055

A7: Japanese Unexamined Patent Application Publication No. H6-15549

A8: Japanese Unexamined Patent Application Publication No. 2003-305626

A9: The description of United States Patent No. 6761186

A10: Japanese Unexamined Patent Application Publication No. 2009-190137

A11: Japanese Unexamined Patent Application Publication No. 2013-82025

A12: A micro film of Japanese Utility Model Application No. S62-158511 (Japanese Unexamined Utility Model Application Publication No. H1-65403)

A13: A micro film of Japanese Utility Model Application No. S62-102171 (Japanese Unexamined Utility Model Application Publication No. S64-6373)

A14: Japanese Unexamined Patent Application Publication No. S48-83279

A15: Decision on acceptance or non-acceptance of amendment dated Nov. 20, 2014 in the first trial (invalidation No. 2013-800210)

A16: A written amendment of the grounds of the demand of a written demand for trial in the first trial dated Sep, 17, 2014

A17: Kaneko Toshio, "Pneumatic Equipment and Application Circuits," Nikkan Kogyo Shimbun, Ltd., ver. 3, issued on Feb. 29, 1968

A18: Japanese Unexamined Patent Application Publication No. S59-212503

2. The object of the reply alleged by the Demandee

The object of the reply of the Demandee is to request the body to approve that the demand for trial of the case was groundless, and its allegation is as follows (meanwhile, the underlines in this paragraph have been added by the Demandee).

(1) Regarding interpretation of "outside world" (the written reply page 7, line 2 to page 9, line 6))

In the Patent Invention 1, there is specified "an air passage formed within the cylinder body, the air passage having one end supplied with pressurized air and another end in communication with the outside world," "an opening/closing valve mechanism capable of performing opening and closing of the air passage," and "the valve body is moved by the outputting member to switch an open/close state of the opening/closing valve mechanism, enabling detection of arrival of the outputting member to the predetermined position through an air pressure of the air passage." Therefore, the "outside world" of the Patent Invention 1 is not one that simply means the outside of a cylinder body, but is one that decreases air pressure of the one-end side of an air passage when the opening/closing valve mechanism has opened the air

passage, and, thus, it can be clearly understood that it means an external space with a pressure that is lower than that of "pressurized air."

In addition, from the statement of "the opening/closing valve mechanism is made to switch to the valve-opened state to open the air passage to the outside world, and, by that switching, pressure of the air passage located at the one end side relative to the opening/closing valve mechanism is made to be lowered" of the Patent Invention 2, the interpretation that the "outside world" of the Patent Invention 2 is an external space with a pressure that is lower than that of "pressurized air," and is a space in which, when an "air passage" becomes communicated with it, air pressure in the one-end side of the "air passage" is reduced can be clearly understood based on only the statements of the scope of claims.

(2) Regarding reason for invalidation 1

A. Regarding flaws in the finding of the A1-described invention

The finding of the A1-described invention alleged by the Demandant is in error at least in the following points.

(A)

A position detecting apparatus according to the Patent Invention is one that is made possible to detect a predetermined position of an outputting member certainly. The Demandant alleges that, also in the A1-described invention, the pilot valve B is constituted so as to be able to detect a position of an outputting member. However, the A1-described invention is one that relates to "an oil pressure control system which is desired to make an operation of hydraulic power actuator of a given apparatus and an operation of a hydraulic power actuator of another apparatus perform a cycle operation," and is not one for the purpose of detecting a position of an outputting member. In the invention described in Evidence A No. 1, the pilot valve B is one that switches a three-way valve when a piston 15 has reached near its stroke end to control operations of a hydraulic power actuator, and is not one to detect a predetermined position of an outputting member of a fluid pressure cylinder. (The written reply, page 9, line 11 to the last line).

(B)

The Demandant alleges that the control fluid is "pressurized air," because, although there is no clear statement of "pressurized air" in A1, if "pressurized oil" is utilized as control fluid, components within a pilot valve are lubricated by the control fluid as a matter of course, and there can be no such problem that the pilot valve "cannot lubricate" these components as described in A1. However, the problem in question is caused by a reason that "the pilot valve unit and an associated cam, as heretofore utilized, are openly exposed with respect to at least a portion of their moving parts," and "these exposed moving parts are easily susceptible to contamination," but not by a reason that "pressurized air" is used. The A1-described invention is an invention that makes a hydraulic actuator perform a cycle operation by the pilot valve B, and, thus, it should be understood that the control fluid of the pilot valve B is a pressurized oil. In addition, also from the statement of A1 that "an important feature of the present invention exists in a point that the actuator fluid also

functions as a lubrication agent of components of a pilot valve" (translation of A1, page 6/6, lines 4 to 5), it is obvious that the control fluid of the pilot valve B is pressurized oil. (The written reply, page 10, line 1 to the last line).

(C)

The Demandant alleges that "a bore extension 33" and "an axial bore passage 48" described in A1 respectively correspond to "an oil pressure introducing chamber" and "an oil pressure introducing passage" of the Patent Invention 1. However, an oil pressure introduced by "the bore extension 33" described in A1 is just for making "a valve body 29" be balanced, and it does not have force to make it move forward at all. In the Patent Invention 1, there is specified "an oil pressure introducing chamber configured to hold the valve body in an advanced state to a side of the outputting member by an oil pressure of the hydraulic chamber," and force to make a valve body move forward toward the side of an outputting member by oil pressure must be generated, and, therefore, the pilot valve B described in A1 is not provided with "an oil pressure introducing chamber configured to hold the valve body in an advanced state to a side of the outputting member by an oil pressure of the hydraulic chamber." (The written reply, page 11, lines 1 to 12).

B. Regarding the finding of corresponding features and different features

As has been indicated in the above-mentioned A, when the Patent Invention 1 and the A1-described invention are compared, they are different in the following three points, in addition to the different features of the Demandant allegation.

A point that, in A1, "an air passage having one end supplied with pressurized air and another end in communication with the outside world" is not described.

A point that an oil pressure introduced to "the bore extension 33" described in A1 is just a pressure to balance "the valve body 29," and there is no force to make it move forward, and, therefore, A1 is not one that discloses "an oil pressure introducing chamber configured to hold the valve body in an advanced state to a side of the outputting member by an oil pressure of the hydraulic chamber," and "an oil pressure introducing passage to make the hydraulic chamber and the oil pressure introducing chamber communicate with each other" of the Patent Invention 1.

A point that the one described in A1 does not indicate position detection of the piston 15, and there is no description or suggestion in A1 concerning the configuration of "when the outputting member reaches a predetermined position, the valve body is moved by the outputting member to switch an open/close state of the opening/closing valve mechanism, enabling detection of arrival of the outputting member to the predetermined position through an air pressure of the air passage." (The written reply, page 11, line 6 from the bottom to page 12, line 13).

C. Regarding an easily-arrived property

It cannot be said that the Patent Invention 1 would have been easily arrived at by a person skilled in the art based on the A1-described invention, because of the following reasons.

(A)

The A1-described invention is just an invention to make a hydraulic actuator perform a cycle operation by the pilot valve B, and it is impossible that an idea to detect a position of an outputting member (the piston 15) arises, and there is no motivation to try to apply the configuration of position detection in this. Accordingly, the constituent component of the Patent Invention 1 is not one that would have been easily arrived at by a person skilled in the art from the A1-described invention as a starting point. (The written reply, page 12, lines 17 to the last line).

(B)

It is obvious that the control fluid of the pilot valve B described in A1 is pressurized oil. In addition, from the statement of A1 that "an important feature of the present invention exists in a point that the actuator fluid also functions as a lubrication agent of components of a pilot valve" (translation of A1, page 6/6, lines 4 to 5), to make the control fluid of the pilot valve B be pressurized air leads to violate the above-mentioned "important feature" of the A1-described invention, and, thus, it can hardly be said that this would have been easily arrived at by a person skilled in the art.

In order to obtain "air passage" of the Patent Invention by modifying the A1-described invention, a flow path leading to the pilot valve B has to be opened to an external space (outside world) of the atmospheric pressure. However, in A1, it is supposed to be a problem that a part of a pilot valve unit is opened to the outside in the conventional structure, and, thus, it has to be understood that the pilot valve B can never be opened to an external space of the atmospheric pressure. Accordingly, the configuration of "an air passage having one end supplied with pressurized air and another end in communication with the outside world" cannot be applied to the A1-described invention.

In addition, "air passage" of the Patent Invention is formed in a "cylinder body," whereas the pilot valve B described in A1 is one that is provided in the valve body 21 attached to a cylinder, but not one formed in a "cylinder body." Then, there exists no motivation to form the structure of the pilot valve B described in A1 in a cylinder body. (The written reply, page 13, line 1 to page 14, line 2).

(C)

As has been indicated in the above-mentioned A. (C), the allegation of the Demandant that "the bore extension 33" and "the axial bore passage 48" described in A1 respectively correspond to "an oil pressure introducing chamber" and "an oil pressure introducing passage" of the Patent Invention 1 is not reasonable. Accordingly, by combination with the inventions described in A3, 5, and 6 that premise on such point, the allegation to the effect that a person skilled in the art would have been easily arrived at the configuration that "the opening/closing valve mechanism comprises: a valve body mounted in a mounting hole formed in the cylinder body in a manner capable of moving forward and backward; an oil pressure introducing chamber configured to hold the valve body in an advanced state to a side of the outputting member by an oil pressure of the hydraulic chamber; and an oil pressure introducing passage to make the hydraulic chamber and the oil pressure introducing chamber communicate with each other" of the Patent Invention 1 is also unreasonable, and there is no motivation to modify the A1-described invention to one "to make a valve body

move forward toward to the side of an outputting member by oil pressure." (The written reply, page 14, lines 3 to 12).

D. Summary

The Patent Invention 1 is not an invention that would have been able to be invented by a person skilled in the art with ease taking the A1-described invention as a starting point. Then, the Patent Invention 1 has an inventive step, and, therefore, it is also obvious that the Patent Inventions 2 to 7 that are inventions according to the dependent claims of claim 1 have an inventive step.

Accordingly, the reasons for invalidation 1 alleged by the demandant that insists a lack of inventive step of the Patent Invention taking the A1-described invention as a primary cited invention is groundless. (The written reply, page 14, line 13 to the last line).

(3) Regarding the reason for invalidation 2

A. Regarding the finding of the A2-described invention

(A)

The A2-described invention is one in which "a valve operator 44" and "a valve member 46" are biased toward the side of "a piston 24" by biasing force of "a spring 50," but not one that includes "an oil pressure introducing chamber" and "an oil pressure introducing passage." (The written reply, page 15, lines 3 to 14).

(B)

In the A2-described invention, although "a conduit 58" as a pressure entrance hole and "a conduit 56" as a pressure exit hole communicate with each other or are blocked from each other by "a valve member 46," "the conduit 56" as a pressure exit hole is not one that is communicated with the outside world, and "a conduit 64" for exhaust is provided separately. Then, "the conduit 58" as a pressure entrance hole and "the conduit 64" for exhaust are never in communication with each other. In the A2-described invention, switching of a flow path is carried out by a three-way valve, and "one end supplied with pressurized air" and "another end in communication with the outside world" never communicate with each other, and, therefore, it is not one that performs "opening and closing of the air passage" as it is called in the Patent Invention. The A2-described invention does not include "an air passage formed within the cylinder body, the air passage having one end supplied with pressurized air and another end in communication with the outside world" and "an opening/closing valve mechanism capable of performing opening and closing of the air passage." In addition, in the A2-described invention, "the conduit 58" as a pressure entrance hole and "the conduit 64" for exhaust are never in communication with each other, and, thus, there is no case that the pressure of "the air passage located at the one-end side relative to the opening/closing valve mechanism" rises and declines as is the case with the Patent Invention 2. (The written reply, page 15, line 17 to page 17, line 7).

B. Regarding the finding of the corresponding features and the different features

In addition to the different feature 2-1 of the above-mentioned 1. (2) A. alleged by the demandant, in the A2-described invention, "the conduit 56" that is a pressure exit hole does not communicate with the outside world, and "the conduit 58" that is a pressure entrance hole never communicates with "the conduit 64" for exhaust. Therefore, there is no description or suggestion in Evidence A No. 2 about the configuration of "an air passage formed within the cylinder body, the air passage having one end supplied with pressurized air and another end in communication with the outside world," "an opening/closing valve mechanism capable of performing opening and closing of the air passage" and "the valve body is moved by the outputting member to switch an open/close state of the opening/closing valve mechanism, enabling detection of arrival of the outputting member to the predetermined position through an air pressure of the air passage" of the Patent Invention 1. (The written reply, page 17, lines 8 to 23).

C. Regarding an easily-arrived property

It cannot be said that the Patent Invention 1 would have been easily arrived at by a person skilled in the art based on the A2-described invention, because of the following reasons.

(A)

The A2-described invention is not one that includes "an oil pressure introducing chamber" and "an oil pressure introducing passage." In the first place, in the A2-described invention, the pressure of control fluid (pressurized air) controlled by "the valve member 46" is introduced from "the conduit 58" (pressure entrance hole) to "a valve bore 53" that houses "the valve member 46" to make force in the moving forward direction act to "the valve member 46," and, therefore, an idea of trying to introduce fluid pressure (oil pressure) for driving "the piston 24" to this "valve bore 53" cannot occur.

In addition, the oil pressure introduced to "the bore extension 33" described in A1 is just a pressure to make "the valve body 29" be balanced, and does not have force to make it move forward at all, and, thus, the Demandant allegation that "the bore extension 33" and "the axial bore passage 48" described in A1 respectively correspond to "an oil pressure introducing chamber" and "an oil pressure introducing passage" of the Patent Invention 1 is unreasonable. Moreover, in the matters described in A3, it is not assumed that different fluids as oil pressure and pneumatic pressure are used, and, therefore, there is no description or indication also in Evidence A No. 3 about the idea of the Patent Invention that, while controlling "pressurized air" by an "opening/closing valve mechanism," an "oil pressure introducing chamber" and an "oil pressure introducing passage" for introducing "oil pressure" are provided in that "opening/closing valve mechanism." Accordingly, even if the matters described in A1 or A3 are combined with the A2-described invention, the Patent Invention 1 cannot be obtained. (The written reply, page 17, line 3 from the bottom to page 19, line 3).

(B)

In the A2-described invention, "the conduit 56" that is a pressure exit hole does not communicate with the outside world, and "the conduit 58" that is a pressure entrance hole is never in communication with "the conduit 64" for exhaust. It cannot

be said that "an air passage having one end supplied with pressurized air and another end in communication with the outside world" that is the matter specifying the Patent Invention 1 is shown in Evidence A No. 2. (The written reply, page 19, lines 4 to 20).

D. Summary

The Patent Invention 1 is not one that could be easily made by a person skilled in the art with ease taking the A2-described invention as a starting point. Then, the Patent Invention 1 has an inventive step, and, therefore, it is also obvious that the Patent Inventions 2 to 7 that are inventions according to the dependent claims of claim 1 have an inventive step.

Accordingly, the reason for invalidation 2 alleged by the demandant that insists a lack of inventive step of the Patent Invention taking the A2-described invention as a primary cited invention is groundless. (The written reply, page 19, line 6 from the bottom to page 20, the last line).

(4) Regarding the reason for invalidation 3

A. Regarding finding of the A3-described invention

A3 is A12 in the foregoing first trial case (invalidation No. 2013-800210) for the Invention in which the trial decision has already become final and conclusive. In addition, A3 is one that claims priority based on an application filed in Germany on May 20, 1965 (Application Number: St23856) as is the case with the description of United States Patent No. 3540348 (B4), and it has substantially the same content with B4. B4 is A1 in the first trial. (The written reply, page 21, lines 3 to 12).

(A)

The Patent Invention 1 is one that is constituted such that a predetermined position of an outputting member can be detected certainly, whereas the A3-described invention is one for the purpose of preventing stoppage of driving of a piston, but not one for the purpose of detecting a position of an outputting member. Pilot valves 63 and 100 described in A3 are ones for giving pressure to a four-way valve 36 or a three-way valve 37 when a piston 21 has reached near its stroke end, but not ones that detect a predetermined position of an outputting member of a fluid pressure cylinder. (The written reply, page 21, lines 13 to 24).

(B)

In a position detecting apparatus of the Patent Invention 1, driving of an outputting member is carried out by oil pressure, and air pressure is controlled by an opening/closing valve mechanism, whereas, in the A3-described invention, when driving of the piston 21 is carried out by oil pressure, control fluid of the pilot valves 63 and 100 will be also pressurized oil. (The written reply, page 21, line 3 from the bottom to page 22, line 3).

B. Regarding an easily-arrived property

(A)

In order to make the A3-described invention be of a "position detecting apparatus," it is necessary that a flow path to supply driving fluid of the piston 21 and a flow path to supply control fluid of the pilot valves 63 and 100 be independent from each other. However, in the A3-described invention, it is constituted such that control of the reverse operation of the piston 21 is performed by causing operations and pressure changes, which include: a driving operation of the piston 21; an opening and closing operation and a pressure change of the pilot valves 63 and 100; and an operation of the four-way valve 36 or the three-way valve 37 and a pressure change of fluid associated with that operation, in a manner being in relation to each other by using common fluid, and, therefore, it cannot be changed to one in which control pipes 61, 93 and a branching path 43 are not in relation to each other. (The written reply, page 22, line 10 to page 23, line 2).

(B)

In both the example described in Fig. 1 A3 (one using the four-way valve 36) and the example described in Fig. 9 of A3 (one using the three-way valve 37), it is not assumed that different fluids as oil pressure and pneumatic pressure are used, and it is difficult to conceive that, in the invention described in Evidence A No. 3, control fluid of the pilot valves 63 and 100 is made to be "pressurized air." (The written reply, page 23, lines 3 to 15).

C. Summary

The Patent Invention 1 is not an invention that would have been able to be invented by a person skilled in the art with ease taking the A3-described invention as a starting point. Then, from the reason that the Patent Invention 1 has an inventive step, it is also obvious that the Patent Inventions 2 to 7 that are inventions according to the dependent claims of claim 1 have an inventive step.

Accordingly, the reason for invalidation 3 alleged by the demandant insisting a lack of inventive step of the Patent Invention taking the A3-described invention as a primary cited invention is groundless. (The written reply, page 23, line 4 from the bottom to page 24, line 7).

(5) Regarding the reason for invalidation 4

The allegation as to the reason for invalidation 4 by the Demandant in the above-mentioned 1. (4) A. is one that has twisted the statement contents of paragraph [0008] of the description of the Original Application as follows, and, thus, it is unreasonable.

The statement of paragraph [0008] of the description of the Original Application is one that describes a problem point of the structure shown in patent document 2 (Japanese Unexamined Patent Application Publication No. 2003-305626) that is a prior art document, and, even if there is a portion to be consciously excluded due to the statement of the paragraph in question, a structure similar to the structure shown in patent document 2 is just excluded.

The structure shown in patent document 2 is one in which the detection tool 62 is unified with the clamp rod 5, and, from this reason, a moving distance of the clamp

rod 5 (outputting member) will be a moving distance of the detection tool 62 (valve body) just as it is, and, thus, a moving distance of the detection tool 62 associated with reciprocation of the clamp rod 5 is large. As a result, a sliding unit is easily worn. In paragraph [0008] of the description of the Original Application, this is pointed out as "there are some fears of degrading the performance to close the air passage." In the Patent Invention 1, the moving distance of a valve body that performs opening and closing of an air passage is small compared with that of an outputting member, and, thus, a problem such as that of patent document 2 never occurs.

In addition, from the statement of paragraph [0008] of the description of the Original Application, a primary problem of patent document 2 to be solved is to have a detection space outside a clamp body, and the sliding-related problem of the Demandant allegation is a secondary one. The Patent Invention is an invention that would be sufficient if the primary problem to be solved can be achieved, and there is also no need to be limited to ones by which the secondary problem is achieved, too.

In [0097] of the description of the Original Application, there is a statement that "4) ... various opening/closing valve mechanisms can be employed within a range not deviating from the intent of the present invention." On the other hand, according to B5, "a spool valve" was a well-known structure together with "a poppet valve" at the time of the filing of the Original Application, and, thus, just because "a spool valve" is not expressly indicated, it cannot be said that it is an invention consciously excluded from the scope the Original Application. (Written Demand, page 25, line 2 to page 27, line 9 from the bottom).

As mentioned above, the Patent Invention is one that has been described in the description of the Original Application, and the divisional application related to the Patent is legal, and, therefore, the reason for invalidation 4 of the allegation of the Demandant is groundless.

(6) Means of proof from the Demandee

The Demandee has submitted B1 to B5 in the written reply.

B1: Shinmura, Izuru (ed.), "Kojien," Iwanami Shoten Publishers, ver. 6, issue of the first copy on Jan. 11, 2008, the front cover, pp. 452 to 455, colophon

B2: Foundation of HOSOKAI (ed.), "Interpretation of Supreme Court Court Decision, Civil affairs, year 1991," Foundation of HOSOKAI, the first version, issue of the first copy on Feb. 25, 1994, front cover, pp. 28-51, colophon

B3: Trial decision of the trial case of Invalidation No. 2013-800210

B4: The description of United States Patent No. 3540348

B5: Corporate juridical person of Japan Hydraulics and Pneumatics Association (ed.), "Hydro-pneumatic Handbook, New Version, " Ohmsha Ltd., the first version, issue of the first copy on Feb. 25, 1989, front cover, pp. 453-458

No. 4 Judgment by the body

1. The statements of each piece of documentary evidence, and the inventions and the matters described in each documentary evidence

(Hereinafter, an invention and a matter described in An are referred to as "An invention" and "An matter", respectively. In addition, when the portion of a statement is specified

by a line number, if there is described a number indicating a line number in the corresponding piece of documentary evidence, it has been specified by that number, and if there is no such number described, it is specified by the number of lines. On that occasion, blank lines are not included in the number of lines. The underlines are given by the body for the convenience of understanding.)

(1) A1

A. There are the following statements in A1, which is a publication that had been distributed before the retroactive filing date of the case.

(A)
"The invention relates to a hydraulic power actuator which is combined with a pilot valve to provide a unit assembly for controlling fluid control circuits in timed relation to the operation of the power actuator." (Column 1, lines 5 to 8)

(B)
"The pilot valve unit and associated cam, as heretofore utilized, were more or less openly exposed with respect to at least a portion of their moving parts. These exposed moving parts were easily susceptible to contamination and lacked proper provision for proper protection against the elements, or for lubricating internal parts. ...

The above noted problem as well as others inherent in the presently known conventional arrangements have to a great extent been eliminated by the herein-described invention by providing a unitized assembly wherein the cycling pilot control valve is intimately associated with the power actuator in order to provide an integrated unit assembly, wherein the operatively associated moving parts of the actuator and pilot valve will be entirely enclosed, and in which the pilot valve means will be lubricated by the pressurized fluid medium utilized for motivating the actuator." (Column 1, lines 26 to 46)

(C)
"Referring more specifically to the drawings, the present invention for illustrative purposes is shown in Fig. 1 as comprising a hydraulic power actuator A and the pilot valve B which have been combined according to the present invention into a unit assembly for use in systems utilizing a plurality of fluid actuators, and in which it is desired to cycle the operation of control for certain of the devices in dependence upon the operation of one or more of the hydraulic actuators.
The hydraulic power actuator A is of conventional construction insofar as it comprises a cylinder 10 having its ends mounted in an end cap structure 11 at one end and a power delivery end cap structure 12 at its other end. These end caps are provided with suitable ports adapted for connection with a supply conduit 13 in the case of the end cap 11, and a conduit 14 in the case of the end cap 12. By means of these conduits, suitable actuator fluid pressure may be alternately admitted and exhausted to the cylinder for actuating an operatively associated piston 15 therein for reciprocable movement, this piston being connected with a power delivery piston rod 16 which is carried through a suitable bushing in the end cap 12 where it is provided with appropriate coupling means (not shown) for connecting to the device to be operated thereby. The rods 17 interconnect

the end caps and retain them in assembled relation with the cylinder to provide the actuator assembly." (Column 2, lines 38 to 61)

(D)
"As will be seen, the power delivery end cap may be provided with a suitable attachment flange or flanges 18 for mounting the actuator assembly, as by one or more securing bolts 19 and associated nuts 20. As thus arranged, the end cap 11 will be outwardly disposed and is shown in this case as having the pilot valve B mounted thereon. In this position, the pilot valve will be actuated when the piston rod reaches the end of its retracted stroke. It will be appreciated, however, that a similar pilot valve might also be mounted at the power delivery end cap 12 so as to provide cycling control at the end of the extended position of the power delivery piston rod. Should it be required that the system be so operated, a pilot valve may be positioned at each end of the cylinder. It is believed that the operation of the pilot valve will be fully comprehended from a description of a valve as mounted at one position only, for example, upon the end cap structure 11." (Column 2, line 62 to column 3, line 3)

(E)
"Reciprocably mounted within the bore 22 is a spool valve 29, this valve having end portions 30 and 31 respectively in an axially spaced apart relation and being interconnected by a neck portion 32 of reduced diameter. ... With a valve spool as thus arranged, it is readily apparent that the valve can be moved to an upper position wherein the connection ports 26 and 28 will be connected while the port 26 will be disconnected with respect to the port 27. On the other hand, the valve spool is displaceable to a lower position in which the port 26 will connect with the port 27, but will be disconnected with respect to the port 28. Selectivity of flow between the ports is thus controlled." (Column 3, lines 25 to 42)

(F)
"In the raised position of the spool valve, as shown in Fig. 1, it will be noted that an edge of the roller extends into the cavity 24, and that when the spool valve is urged by the spring 35 to the limit of its movement, the roller will be in a position within the cavity 24 wherein it will be in the path of movement of a cam member 43 carried by and axially in alignment with the piston 15. When the piston is moved to the right, as shown in Fig. 1, the cam member will be withdrawn from the cavity 24, and the spool valve is then free to be urged downwardly to one of its control positions. However, when the piston is moved in an opposite direction so that the cam member re-enters the cavity 24, a cam surface thereon, as indicated by reference numeral 44, will engage the roller and move it to its other control position. As thus arranged, it is clear that the actuation of the valve will be synchronized with movements of the piston of the actuator. As previously mentioned, in some installations it may be desirable to also actuate a pilot valve at the end of the power delivery stroke of the actuator." (Column 3, line 56 to column 4, line 1)

(G)
"This fluid being pressurized acts on the opposite end of the spool valve, and would tend to force the valve against the pressure of the spring 35 and thus produce faulty

operation. This is prevented by providing an equalizing pressure of fluid at the opposite end of the spool valve through a passageway which connects the source of fluid pressure with the bore extension 33. For convenience, this is accomplished by providing an axial bore passage 48 which interconnects the spaces at the opposite ends of the valve spool and subjects end areas to fluid pressure which balances the valve spool so that the fluid pressure does not interfere with the spool operation." (Column 4, lines 15 to 25)

(H) Fig. 1

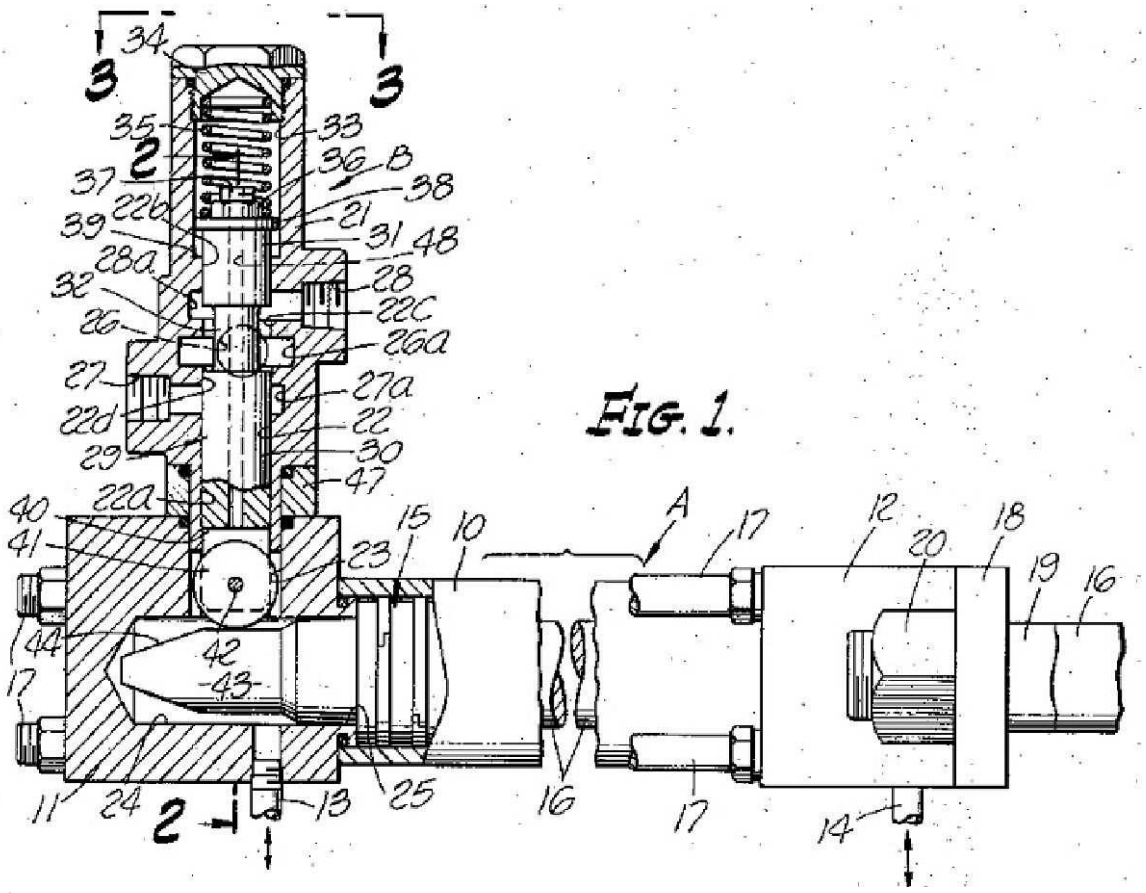


FIG. 1.

(I)

From the statement that "The hydraulic power actuator A is of conventional construction insofar as it comprises a cylinder 10 having its ends mounted in an end cap structure 11 at one end and a power delivery end cap structure 12 at its other end. These end caps are provided with suitable ports adapted for connection with a supply conduit 13 in the case of the end cap 11, and a conduit 14 in the case of the end cap 12. By means of these conduits, suitable actuator fluid pressure may be alternately admitted and exhausted to the cylinder for actuating an operatively associated piston 15 therein for reciprocable movement, this piston being connected with a power delivery piston rod 16 which is carried through a suitable bushing in the end cap 12 where it is provided with appropriate coupling means for connecting to the device to be operated thereby." of the above-mentioned extracted matter (C), the cylinder body 10 described in A1 is equipped with the piston 15 and the piston rod 16 in a manner capable of moving

forward and backward. Then, since the power actuator A described in A1 is equipped with the piston 15 and the piston rod 16 actuated by oil pressure, it is obvious that it is one that is provided with a hydraulic chamber for driving the piston 15 and the piston rod 16 toward at least one of the moving-forward side and the moving-backward side.

(J)

From the statement of "Reciprocably mounted within the bore 22 is a spool valve 29, ... the valve can be moved to an upper position wherein the connection ports 26 and 28 will be connected while the port 26 will be disconnected with respect to the port 27. On the other hand, the valve spool is displaceable to a lower position in which the port 26 will connect with the port 27, but will be disconnected with respect to the port 28. Selectivity of flow is thus controlled between the ports" of the above-mentioned extracted matter (E), it is obvious that the spool valve 29 described in A1 is one that switches the port 26 coupled to a flow path through which fluid flows between the ports 27 and 28, and each of the flow paths coupled to the ports 26, 27 and 28 has one end supplied with fluid and the other end in communication with another place situated outside the pilot valve B. Then, in Fig. 1, there is shown that each of the ports 26, 27 and 28 is a flow path formed in the valve body 21. In addition, it can be said that one of the ports 26, 27 and 28 is one that is supplied with fluid, and the other end will communicate with another place. Furthermore, from "the connection ports 26 and 28 will be connected while the port 26 will be disconnected with respect to the port 27" of the above-mentioned summarization, it can be said that the pilot valve B is capable of opening and closing a flow path because the flow path in question having been open between the flow paths respectively coupled to the port 26 and the port 27 is closed along with new communication between the port 26 and 28. Then, it is obvious that the spool valve 29 described in A1 is one that is formed in the valve body 21, and, thus, there are described a flow path having one end supplied with fluid and the other end in communication with another place, and the pilot valve B capable of opening and closing this flow path.

In addition, there are: the statement of "the present invention comprises a hydraulic power actuator A and the pilot valve B which have been combined according to the present invention into a unit assembly for use in systems utilizing a plurality of fluid actuators, and in which it is desired to cycle the operation of control for certain of the devices in dependence upon the operation of one or more of the hydraulic actuators." of the above-mentioned extracted matter (C); the statement of "there are provided a port adapted for connection with a supply conduit 13 in the case of the end cap 11, and a conduit 14 in the case of the end cap 12. By means of these conduits, suitable actuator fluid pressure may be alternately admitted and exhausted to the cylinder for actuating an operatively associated piston 15 therein for reciprocable movement." of the above-mentioned extracted matter (C); the statement of "the pilot valve will be actuated when the piston rod reaches the end of its retracted stroke. However, that a similar pilot valve might also be mounted at the power delivery end cap 12 so as to provide cycling control at the end of the extended position of the power delivery piston rod." of the above-mentioned extracted matter (D); the statement that "the valve can be moved to an upper position wherein the connection ports 26 and 28 will be connected while the port 26 will be disconnected with respect to the port 27. On the other hand, the valve spool is displaceable to a lower position in which the port 26

will connect with the port 27, but will be disconnected with respect to the port 28. Selectivity of flow is thus controlled between the ports" of the above-mentioned extracted matter (E); and the statement that "When the piston is moved to the right, as shown in Fig. 1, the cam member will be withdrawn from the cavity 24, and the spool valve is then free to be urged downwardly to one of its control positions. However, when the piston is moved in an opposite direction so that the cam member re-enters the cavity 24, a cam surface thereon, as indicated by reference numeral 44, will engage the roller and move it to its other control position. As thus arranged, it is clear that the actuation of the valve will be synchronized with movements of the piston of the actuator." of the above-mentioned extracted matter (F). Then, it is obvious that the above-mentioned pilot valve B includes the cam member 43 provided in the piston 15 and the spool valve 29 that performs reciprocation by the spring 35, and opening and closing of the above-mentioned flow path is performed by the spool valve 29, thereby controlling the piston 15 so as to perform reciprocation by pressure of fluid alternately supplied to or exhausted from supply conduit 13 or 14 of the hydraulic power actuator A.

B. A1 invention

When the above-mentioned extracted matters (A) to (G), the illustration of (H), and the finding matters (I) and (J) are put together in consideration of the common general technical knowledge, the following A1 invention is described in A1.

"An on-off valve apparatus activated when, in a hydraulic power actuator A comprising a cylinder body 10, a piston 15 and a piston rod 16 mounted in the cylinder body 10 in a manner capable of moving forward and backward, and a hydraulic chamber for driving the piston 15 and the piston rod 16 toward at least one of a moving-forward side and a moving-backward side, the piston 15 and the piston rod 16 reach an end of a retracted stroke, the on-off valve apparatus comprising:

a flow path, formed in the valve body 21, to connect a port 26 and 27 and a flow path, formed in the valve body 21, to connect the port 26 and a port 28; and a pilot valve B capable of switching the flow paths by opening and closing the flow paths, wherein

the pilot valve B comprises: a spool valve 29 mounted in a manner capable of moving forward and backward relative to a mounting hole formed in an end cap 11; a bore extension 33 to keep the spool valve 29 in a state being advanced to a side of the piston 15 and the piston rod 16 by spring force of a spring 35; and an axial bore passage 48 to make the hydraulic chamber and the bore extension 33 communicate with each other, wherein

when the piston 15 and the piston rod 16 reach the end of the retracted stroke, the spool valve 29 is made to move by a cam member 43 provided in the piston 15 to switch an open/close state of the pilot valve B, and, by thus switching the open/close state of the flow paths, a configuration capable of performing control so as to make the piston 15 and piston 16 reciprocate is formed, and wherein

the on-off valve apparatus is activated when the piston 15 and the piston rod 16 reach the end of the retracted stroke."

(2) A2

A. There are the following statements in A2, which is a publication having been

distributed before the retroactive filing date of the case.

(A)
"ABSTRACT A fluid control arrangement including a cylinder having a pair of spaced heads joined by a hollow body in which a piston is mounted for reciprocal movement. A valve unit is provided in a valve bore integrally formed within at least one of the heads of the cylinder. The valve unit includes a spring-biased reciprocable valve member having a valve operator integrally formed therewith and extending into the hollow body so as to be in actuatable relation with the piston. A pair of conduit openings extend into the valve bore, and, depending upon the positioning of the valve member in the bore due to the operation of the piston, communicate with or are blocked from each other."

(B)
"AIR CYLINDER WITH PILOT VALVE IN HEAD
This application is a continuation of application Ser. No. 750,998 filed July 18, 1968, now abandoned, which in turn was a continuation of application Ser., No. 570,075, filed Aug. 3, 1966, now abandoned.

This invention relates generally to pneumatic control circuitry and more particularly to pneumatic control circuitry which incorporates a pneumatic or hydraulic cylinder jack and a pneumatic pilot valve." (Column 1, lines 1 to 9)

(C)
"These and other objects and features of the invention will become more apparent from a consideration of the following descriptions.
A pneumatic control arrangement in accord with the invention includes a cylinder having spaced heads and a hollow body connecting the heads. One of the heads of the cylinder is fashioned with a valve bore and with spaced pneumatic conduits opening into the bore. A reciprocable piston is situated in the cylinder, and a valve unit is located in the head having the valve bore. The valve unit itself includes a valve operator that projects from the valve bore through an inner wall portion of the corresponding head into actuatable relationship with the piston, and a reciprocable valve member is arranged in the bore to move with the valve operator (preferably being integral therewith), the valve member being provided with flow control passageway means for selectively connecting the pneumatic conduits.
In order that the principles of the invention may be readily understood, two embodiments thereof, but to which the application is not to be restricted, are shown in the accompanying drawing, wherein:" (Column 1, lines 28 to 49)

(D)
"In the examples of the invention hereinafter set forth the term "pneumatic" is exemplary; hydraulic mechanisms and circuits are also contemplated. Referring now in detail to the drawing, specifically to Fig. 1, a pneumatic control arrangement indicated generally by reference numeral 10 is seen to comprise a pneumatic cylinder 12 and pneumatic pilot valves 14 and 16. The cylinder 12 includes a pair of spaced heads 18 and 20 of block like construction which are connected by a hollow cylindrical tube or

body 22 in defining a housing for a reciprocable piston 24. The piston 24 is secured on a piston rod 26 by means of a radially projecting flange 28, which may be defined by a washer, and a nut 30 which turns on a threaded inner end 32 of the piston rod 26. On its external end, the piston rod 26 carries a threaded attachment site 34 or other means for coupling the piston rod to an element which it is desired to be driven. The introduction and exhaust of pressurized fluid for moving the piston 24 are achieved by pipes 36 and 38 which are threaded into or otherwise suitably connected with the heads 18 and 20 respectively. The pipes 36 and 38 are connected by passageways 40 into the hollow body 22. Radially outwardly of the external wall of the body 22, the heads 18 and 20 are held rigidly against the hollow cylindrical body 22 by cylindrical rods 97." (Column 1, line 63 to column 2, line 10)

(E)
"In compliance with the features of the present invention, the pilot valves 14 and 16 are incorporated directly in the associated heads 18 and 20 to be integral therewith; and turning to a consideration of FIGS. 2 and 3, a valve unit 16 comprises a valve operator 44 integral with a reciprocable valve member 46, a flow directing arrangement 48, and a biasing spring 50. The valve operator 44 projects through a reduced diameter end portion 52 of a valve bore 53, the bore 53 being fashioned in the head 20 and an operator 44 extending through an inner wall portion 54 of head 20 into actuatable relationship with the piston 24. In addition to the valve bore 53, the head 20 is fashioned with pneumatic conduits 56 and 58 which open radially into the bore 53. From an inspection of Fig. 3, it will be apparent that the pneumatic conduits 56 and 58 are spaced longitudinally of the axis of bore 53. Conveniently, an inlet fitting 60 is mounted in communication with conduit 58, and an outlet fitting 62 is secured in communication with the conduit 56. An exhaust conduit 64 may also be arranged to open into the valve bore 53 at a different longitudinal position than either the conduit 56 or the conduit 58."
(Column 2, lines 11 to 31)

(F)
"Although various means may be employed to provide appropriate connection between the valve operator 44 and the reciprocable valve member 46, it has proved convenient and preferable to form them integrally; the valve member 46 is of the nature of a spool valve member including a cylindrical portion 66 and a spaced follower portion 68 connected thereto by a reduced diameter or necked-down region 70, the region 70 forming an annular flow control passageway for selectively connecting the pneumatic conduits 56 and 58, and the valve member 46 also blocks fluid communication between the pilot valve and the main cylinder, as will be apparent hereinafter. Advantageously, the valve member 46 is drilled with a bore 72 that defines a retainer for one end of spring 50. Being a compression spring, the spring 72 requires an opposing abutment, and this latter function is fulfilled by a plug 74 which is turned into a threaded bore 76 that is formed coaxially with the valve bore 53. Means of a sealing cap 74 and the head 20 to prevent fluid from escaping from valve bore 53 is provided." (Column 2, lines 32 to 51)

(G)

"Cooperating with the annular chamber or groove that is defined by the necked-down region 70, the flow directing arrangement 48 comprises a system of alternating resilient sealing means 78, conveniently rubber O-rings, and respectively labeled from left to right as 78b, 78c, and 78d, and spacing means or ring spacers 80. Each of the spacing means or ring spacers 80 is formed with a generally U-shaped cross section with the closed end thereof disposed generally radially inwardly. In addition, each of the spacers 80 is perforated with a series of arcuate ports 82 in the floor or inner collar thereof. Thus, each of the spacers defines a radially outwardly opening groove which is communicated in the radially inward direction by means of the ports 82. In order to direct flow between the several conduits 56, 58, and 64, one of the spacers 80 is aligned radially with each of these conduits, as is well shown in Fig. 3. Cooperatively, the axial extent or length of the necked-down region 70 is arranged to span the radial distance between immediately adjacent spacers 80." (Column 2, lines 52 to 69)

(H)

At one extremity of its travel, the piston 24 will forcibly engage the valve operator 44 to drive the same inwardly and against the compression spring 50. As the valve operator 44 moves inwardly, the necked-down region 70 moves from the position shown in Fig. 3 until its axial length spans the radial distance between the conduit 56 and the conduit 58. A fluid path will thus be formed permitting a pressurized fluid to flow, for example, from the conduit 58 through the ports 82 in the spacer 80 aligned therewith, into the annular chamber defined by the necked-down region 70 and the resilient seal 78 and thence through the ports 82 in the spacer 80 aligned with the conduit 56 and ultimately into the latter conduit. In this position, a portion 66 of the valve member engages the resilient seal 78c which in turn engages the bore 53, blocking flow of pressurized fluid to the conduit 64. Upon retreat of the piston 24, the valve operator 44 will be released to the action of spring 50 and/or the force exerted by pressurized air on the equivalent area of the follower portion 68 and the valve member 46 will be returned to its normal outward position shown in Fig. 3 where the necked-down region 70 communicates the conduit 56 with the exhaust conduit 64 and where the follower portion 68 engages the resilient seal 78d which in turn engages bore the 53, blocking flow of pressurized air from the conduit 58 to the conduits 56 and/or 64. In these movements of the valve member 46, the several resilient seals 78b, 78c, and 78d provide a sealing action against both the walls of valve bore 53 and the radially outwardmost surfaces of the valve member 46; specifically, the portions 66 and 68 thereof. The cylindrical portion 66 always engages the seal 78b, thereby blocking fluid communication between the pilot valve and the main cylinder. It should be recognized that the movements of the piston 24 may thus be employed, through the resultant manipulations of the pneumatic valve 16, to control the actuation of some other device, such as, for example, a related pneumatic cylinder, valve, or other device, or it may be employed in a servomechanism sense to provide information about the position of the piston 24. (Column 2, line 70 to column 3, line 31)

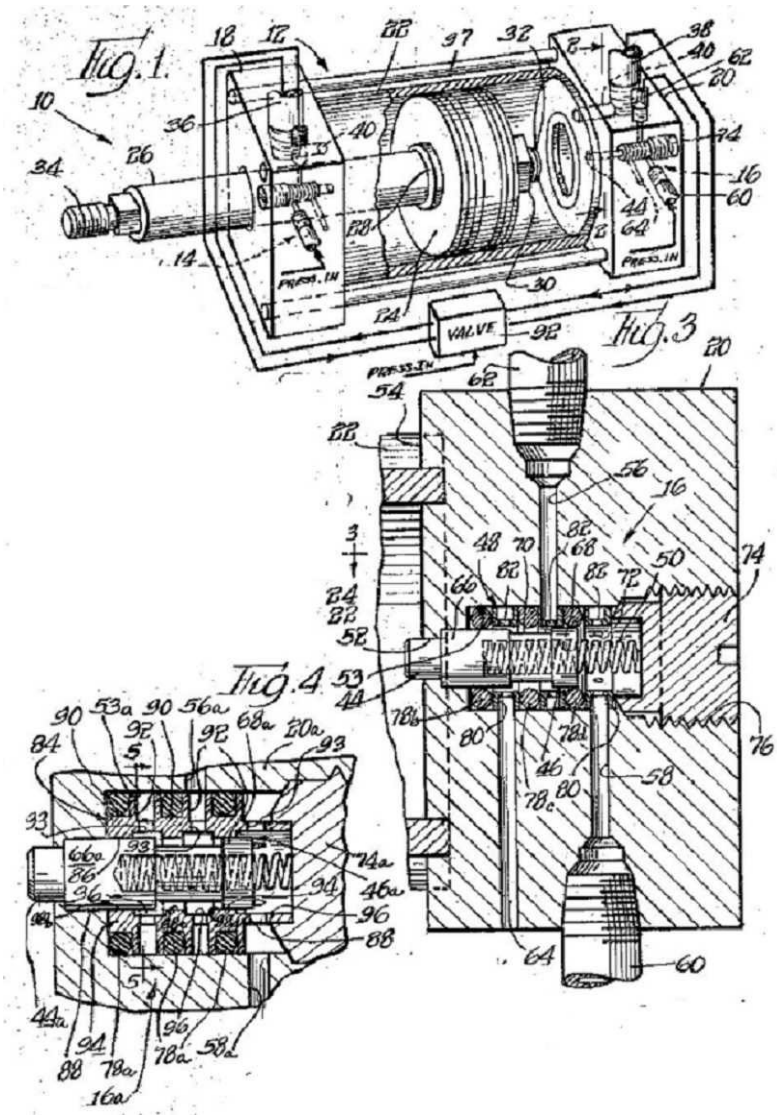
(I)

"In accordance with a feature of the invention, the conduit 58 comprises a pressure inlet conduit as has been described hereinabove; and in further accord with the invention, the conduit 56 comprises a pressure outlet conduit between the pressure inlet conduit 58

and the inner wall portion 54 of the head 20. With the pressure inlets and outlets and the exhaust conduit positioned as shown, fluid pressure from the inlet conduit 58 cooperates with the bias established by the spring 50 in resisting pressurized fluid forces imposed on the valve operator 44 and the valve member 46 from within the hollow body of the cylinder 12, thus preventing movement of the operator 44 from its outward position by these pressurized fluid forces."
(Column 3, lines 32 to 43)

(J)
"In Fig. 1 the main cylinder conduits or pipes 36 and 38 are shown schematically as extending to an external master valve 92 receiving inlet pressure as indicated. The valve is capable of alternately supplying pneumatic pressure to the ends of the main cylinder, and venting to atmosphere at the nonpressurized end. The pilot valve outlets 62 also extend to the valve 92 for controlling the position thereof. This arrangement causes the piston 24 to reciprocate continuously. Although this feature is believed to be novel, it is clearly to be understood that pneumatic connections other than through the valve 92 are contemplated."
(Column 3, lines 65 to 75)

(K) Figs. 1, 3, and 4



(L)

From the statement that "In the examples of the invention hereinafter set forth the term 'pneumatic' is exemplary; hydraulic mechanisms and circuits are also contemplated." of the above-mentioned extracted matter (D), it can be said that there is described in A2 the piston rod 26 driven by oil pressure, and it is obvious that there is provided a hydraulic chamber for that.

(M)

When the statement that "It should be recognized that the movements of the piston 24 may thus be employed, through the resultant manipulations of the pneumatic valve 16, ... in a servomechanism sense to provide information about the position of the piston 24." of the above-mentioned extracted matter (H) is reviewed taking into consideration that the piston rod 26 is provided in the piston 24 and integrally moves therewith, it is obvious that in A2 there is described a position detecting apparatus to detect a position of the piston rod 26.

(N)

From the statement of "As the valve operator 44 moves inwardly, the necked-down region 70 moves from the position shown in Fig. 3 until its axial length spans the radial distance between the conduit 56 and the conduit 58. A fluid path will thus be formed permitting a pressurized fluid to flow, for example, from the conduit 58 through the ports 82 in the spacer 80 aligned therewith, into the annular chamber defined by the necked-down region 70 and the resilient seal 78 and thence through the ports 82 in the spacer 80 aligned with the conduit 56 and ultimately into the latter conduit. In this position, the portion 66 of the valve member engages the resilient seal 78c which in turn engages the bore 53, blocking flow of pressurized fluid to the conduit 64. Upon retreat of the piston 24, the valve operator 44 will be released to the action of the spring 50 and/or the force exerted by pressurized air on the equivalent area of the follower portion 68, and the valve member 46 will be returned to its normal outward position shown in Fig. 3" of the above-mentioned extracted matter (H) describing about the operation of the valve operator 44 of the pneumatic valve 16, it is obvious that the pneumatic valve 16 is capable of opening and closing the conduits 56, 58, and 64, because the flow path passageways between the conduits 56, 58, and 64 are formed; i.e., opened, or blocked by the pneumatic valve. In addition, from the statement that "At one extremity of its travel, the piston 24 will forcibly engage the valve operator 44 to drive the same inwardly and against the compression spring 50." of the above-mentioned extracted matter (H), the piston 24 and the valve operator 44 engage at a specified position as "one extremity of its travel" to start movement of the valve operator 44, and, therefore, it can be said that, when the piston rod 26 reaches a predetermined position, the valve member 46 having the valve operator 44 formed in it is made to move. Furthermore, it is obvious to a person skilled in the art that, on that occasion, an open/close state of the conduit 56 is switched between the conduit 58 having an end supplied with pressurized air and the conduit 64 having an end in communication with the outside world.

In addition, from Fig. 2, it is shown diagrammatically that the valve member 46 is housed inside a mounting hole formed in the head 20.

(O)

From the statement of "Upon retreat of the piston 24, the valve operator 44 will be released to the action of the spring 50 and/or the force exerted by pressurized air on the equivalent area of the follower portion 68, and the valve member 46 will be returned to its normal outward position shown in Fig. 3." of the above-mentioned extracted matter (H), the statement of "fluid pressure from the inlet conduit 58 cooperates with the bias established by the spring 50 in resisting pressurized fluid forces imposed on the valve operator 44 and the valve member 46 from within the hollow body of the cylinder 12, thus preventing movement of operator 44 from its outward position by these pressurized fluid forces." of the above-mentioned extracted matter (K), and the diagrammatical illustration of Fig. 3 that the conduit 58 is opened to a space in the right side of the follower portion 68, it can be said that there is described in A2 a space in which: a state that the valve member 46 has been made to advance to the side of the piston rod 26 is held by being configured such that the pressure of pressurized air continues to act in a direction to move the operation tool 44 toward inside the cylinder 12; and, when the piston 24 retreats, the valve operator 44 is released.

B. A2 invention

When the above-mentioned extracted matters (A) to (J), the diagrammatical illustration of (K), and the finding matters (L) to (O) are put together in view of the common general technical knowledge, there is described in A2 the following A2 invention.

"A position detecting apparatus for detecting a position of a piston rod 26 in a hydraulic cylinder having a cylinder 12, the piston rod 26 mounted in the cylinder 12 in a manner capable of moving forward and backward, and a hydraulic chamber to drive the piston rod 26 toward at least one of a moving-forward side and a moving-backward side, wherein

a conduit 56, a conduit 58, and a conduit 64 formed within a head 20 are provided, the conduit 58 has an end supplied with pressurized air, the conduit 64 has an end in communication with the outside world, and a pneumatic valve 16 capable of opening and closing a flow path between the conduit openings 56 and 58 and a flow path between the conduit openings 56 and 64 is provided, wherein

the pneumatic valve 16 includes a valve member 46 installed in the mounting hole formed in the head 20 in a manner capable of moving forward and backward, and a space in which a state that the valve member 46 has been made to advance to the side of the piston rod 26 is held by being configured such that the pressure of pressurized air continues to act in a direction to move the operation tool 44 toward inside the cylinder 12, and in which, when the piston 24 retreats, the valve operator 44 is released, and wherein

when the piston rod 26 reaches a predetermined position, the valve member 46 is moved by the piston rod 26 to switch an open/close state of the pneumatic valve 16 between the conduit openings 56 and 58 and between the conduit openings 56 and 64, enabling detection of arrival of the piston rod 26 to the predetermined position through an air pressure of the conduit 56."

(3) A3

A. There are the following statements in A3, which is a publication that was distributed before the retroactive filing date of the case.

(A)

"The present invention relates to improvements in reciprocating fluid pressure devices, and particularly to a hydraulic or pneumatic continuously operated piston drive with reciprocatory movement, especially a double acting pressure booster in which the movements of the low pressure piston reverse the control pressure in the end positions. Although the invention is not limited to pressure boosters but can be applied in the same way to hydraulically or pneumatically operated motors, reference will be made hereinafter mainly only to a double acting pressure booster." (Page 1, lines 9 to 22)

(B)

"In the field of double acting air motors it is known to effect reversal by the phenomenon that the movements of the work piston reduce the control pressure of an impulse controlled four-way valve in the end positions; that is to say, controlled by reducing the pressure, and in which control pipes open on both sides of the control valve connecting the control chambers to the pressure source.

In another type of air motor, the otherwise usual three-way pilot valve operated mechanically by the work piston has been replaced by a simple two-way pilot valve for controlling the four-way valve, in that constant pressure action in the two control chambers of the four-way valve has been ensured by auxiliary bores in the control valve or in the valve body of the four-way valve, which connect the pressure source to the two control chambers, instead of by the three-way pilot valve.
This arrangement has the disadvantage that it fails with slow movement of the work piston. The reason for this is that at very slow operation the pilot valve also opens very slowly so that the pressure loading of the control chamber is effected slowly in the end positions, whereby the control valve commences to shift slowly to its opposite end position and then remains in the mid-position, since the pressure difference is not sufficient to overcome the resistance to further movement. Since in the mid position according to the construction of the slide valve:
(a) the pressure connection and both cylinder connections are cut off, or
(b) the pressure connection is cut off and both cylinder connections are without pressure, the low pressure piston remains stationary and the pilot valve is held in the open position at which it was already located." (Page 1, lines 23 to 62)

(C)
"Figs. 1, 2, 4, and 5 are circuit diagrams of a first arrangement with a four-way valve,
Fig. 3 shows a detail thereof,
Figs. 6 and 8 are sectional views of a four-way valve,
Fig. 7 shows the circuit symbol of the four-way valve,
Figs. 9, 12, 13, and 15 show circuit diagrams with two three-way valves according to the second arrangement,
Figs. 10, 11, and 14 show details thereof,
and
Figs. 16 and 17 are sectional views of the three-way valves in two different control positions." (Page 3, lines 11 to 25)

(D)
"A continuously operating piston drive, which in the constructional examples is a hydraulic double acting pressure booster, consists, as shown in Fig. 1, of a low pressure cylinder 20 with working or main cylinder spaces 22 and 23 separated by a reciprocatory main or work piston 21, and high pressure cylinders 24, 25, as well as high pressure pistons 26, 27 which in the case of a drive motor represent the piston rods. High pressure fluid is supplied through non-return valves 28 and 29 into pipes 30, 21 alternately to the point of use. The high pressure pistons 26, 27 can draw pressure medium during their return strokes through non-return valves 32, 33 in pipes 34, 35. The pipes 34, 35 are adapted to be connected through a four-way valve 36 (Figs. 1, 2, 4, and 5) or two three-way valves 37, 38 (Fig. 9, 12, 13, 15) alternately to a pressure fluid pipe 39 or returning pipe 40 leading to a collecting container 41. The main cylinder spaces 22, 23 of the low pressure cylinder 20 are connected alternately to the pressure pipe 39 and to the return pipe 40 through branch or feed pipes 42 and 43. To this extent, all the circuit diagrams shown are the same. Further, in all diagrams the condition of the various spaces is marked p or o to indicate whether the pressure p or zero pressure o is operative." (Page 3, lines 26 to 55)

(E)
"Two control chambers 50, 51 of the valve 36 are connected constantly to the inlet or pressure fluid pipe 39 through auxiliary ducts or bores 52, 43 (note for the body: this is understood as an error of "53") in the control piston 45." (Page 3, lines 75 to 78)

(F)
"Reverting to Fig. 1, two two-way pilot valves 63, 64 in control pipes 61, 62 are provided for applying the pressure pulse for reversing the four-way valve 36; they are held closed at the position of rest by spring force, and in the terminal positions they are mechanically opened by plungers 65, 66 engaged by the main or work piston 21, whereby the pressure release in the control chambers 50, 51 of the four-way valve are effected to a low pressure zone or to the collecting container 41." (Page 3, line 128 to page 4, line 10)

(G)
"... This is obtained by the connections 98, 99 (Fig. 9).
The reversal of the pressure booster shortly before reaching its end position can be initiated
(a) by the release of pressure in the control chamber of one of the two three-way valves 37, 28;
(b) by the application of pressure to the control chamber of one of the two three-way valves.
In the first place the circuit of Fig. 9 will be explained to show how use is made of the possibility set out under (a) above. During the stroke of the work piston 21 towards the left, the control chamber 96 of the three-way valve 38 is released from pressure through the pipes 94, 99, 43 while the control chamber 96 of the three-way valve 37 is at pressure p through the pipes 93, 98, 42. Since two associated two-way pilot valves 100, 101 remain closed by spring force during the stroke, the pipes 98, 99 ensure that this condition is maintained, since they connect the control chambers to the respective feed pipes 42, 43 running to the low pressure cylinder 20 which have the same pressure.
The reversal in the left-hand end position of the work piston 21 is effected by mechanical operation of the pilot valve 100, by which operation of the control chamber of the three-way valve 37 is released from pressure and the work chamber 23 receives the pressure p. At the same time the control chamber of the three-way valve 38 is placed under pressure through the pipe 99, whereby the valve is reversed and the work chamber 22 is released from pressure. After reversal of the movement the pilot valve 100 is returned to its rest position by spring pressure, but the control pipe 98 ensures that the control chamber of the three-way valve 37 remains without pressure up to the next reversal. The two-way pilot valves 100 and 101 can be constructed as shown in Fig. 10, but in each case the spring force must be greater than the pressure acting on the opposite side of the piston. Instead of spring force it is also possible to use a slide valve with a return action by a differential piston action as shown in Fig. 11." (Page 5, lines 47 to 97)

(H) Fig. 1, and Figs. 9, 10, and 11

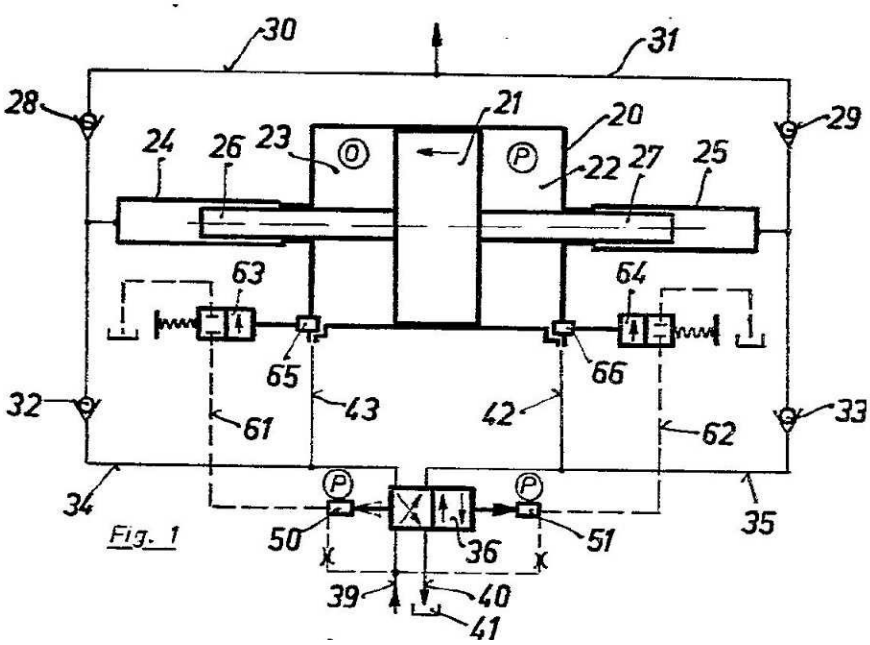


Fig. 1

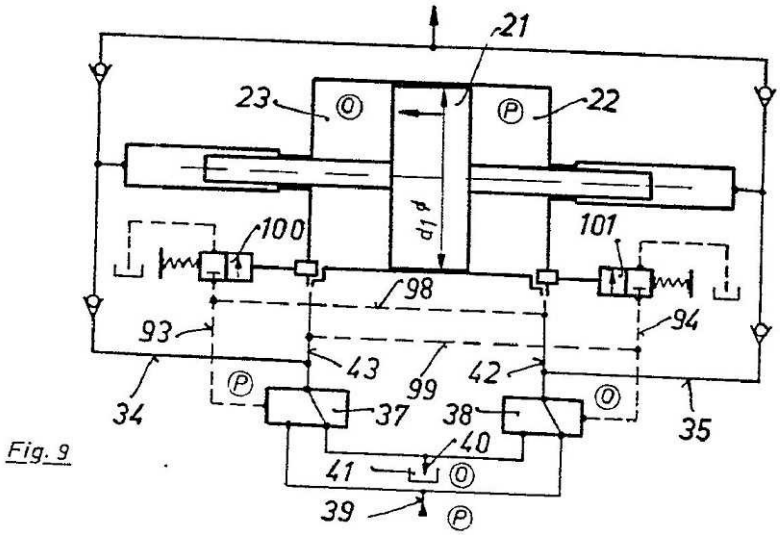


Fig. 9

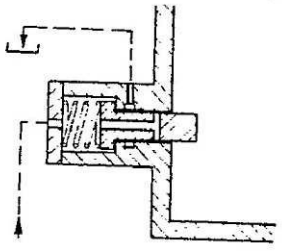


Fig. 10

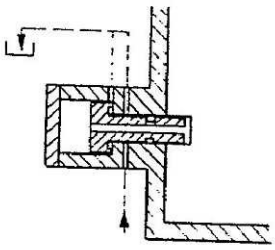


Fig. 11

(I)

When Fig. 11 is seen together with the statement of "The two-way pilot valves 100 and 101 can be constructed as shown in Fig. 10, but in each case the spring force must be greater than the pressure acting on the opposite side of the piston. Instead of spring force it is also possible to use a slide valve with a return action by a differential

piston action as shown in Fig. 11." of the above-mentioned extracted matter (G), there can be perceived in Fig. 11 a structure that the two-way pilot valve 100 is formed in a manner integral with the low pressure cylinder 20, and within that low pressure cylinder 20, there is formed a fluid path having one end connected to the pipe 93 supplied with pressure medium and the other end in communication with a collecting container.

In addition, there can be perceived from Fig. 11 a structure in which the differential pressure piston 100 that is a two-way pilot valve is installed into the mounting hole formed in the low pressure cylinder 20 in a manner capable of moving forward and backward.

Furthermore, there can be also perceived a structure in which the two-way pilot valve 100 includes an oil pressure introducing chamber to keep the differential pressure piston in the advanced state to the side of the piston 21 by oil pressure of a main cylinder space 23, and an oil pressure introducing passage to make the main cylinder space 23 and the oil pressure introducing chamber communicate with each other.

(J)

From the illustration that the two-way pilot valves 63, 64 of Fig. 1 respectively intervene in mid-course of the flow path 61 connected into the control chambers 50, 51, it is obvious to a person skilled in the art that, in the two-way pilot valves 63, 64, fluid paths for connecting in mid-course of the flow path 61 are formed. Then, the statement of "Two control chambers 50, 51 of the valve 36 are connected constantly to the inlet or pressure fluid pipe 39 through auxiliary ducts or bores 52, 43 (Note for the body: this is understood as an error of "53") in the control piston 45." of the above-mentioned extracted matter (E), and the statement of "the pilot valves 63, 64 are held closed in the position of rest by spring force, and in the terminal positions they are mechanically opened by plungers 65, 66 engaged by the main or work piston 21, whereby the pressure release in the control chambers 50, 51 of the four-way valve is effected to a low pressure zone or to the collecting container 41." of the above-mentioned extracted matter (F), it can be understood that, since the flow path 61 is one having one end supplied with pressure medium and the other end in communication with the collecting container 41, the above-mentioned fluid path for connecting to the flow path 61 formed in the two-way pilot valves 63, 64 is also one having one end supplied with pressure medium and the other end in communicated with the collecting container 41 as a matter of course. Then, it is obvious that the two-way pilot valves 63, 64 are capable of opening and closing the fluid path in question.

B. A3 invention and A3 matter

The above-mentioned extracted matters (A) to (G), the illustration of (H), and the finding matters of (I) and (J) are put together while taking the common general technical knowledge into consideration, there is described in A3 the following A3 invention.

"A device carrying out reverse operation in a continuous-operation piston drive including a low pressure cylinder 20, a piston 21, and high pressure pistons 26, 27 mounted in the low pressure cylinder 20 in a manner capable of moving forward and backward, main cylinder spaces 22, 23 for driving the piston 21 and the high pressure pistons 26, 27 toward at least one of the moving-forward side and the moving-backward side, the device comprising:

a fluid path having one end supplied with pressure medium and the other end in communication with a collecting container, two-way pilot valves 63, 64 being capable of opening and closing the fluid path, wherein

when the piston 21 reaches the left end or the right end, a plunger 65 of the two-way pilot valves 63, 64 is made to move by the piston 21 to switch an open/close state of the two-way pilot valves 63, 64, enabling performance of reverse operation through fluid pressure of the fluid path 61."

In addition, there is described the following A3 matter.

"A device, comprising: a fluid path formed within a low pressure cylinder 20, the fluid path having one end supplied with pressure medium, and the other end in communication with a collecting container; and two-way pilot valves 100, 101 capable of opening and closing the fluid path, wherein

each of the two-way pilot valves 100, 101 comprises: a differential pressure piston installed in a mounting hole formed in the low pressure cylinder 20 in a manner capable of moving forward and backward; a fluid pressure introducing chamber to keep the differential pressure piston in an advanced state to a side of the piston 21 by fluid pressure of the main cylinder spaces 22, 23; and a fluid pressure introduction passage to make the main cylinder spaces 22, 23 and the fluid pressure introduction chamber communicate with each other, and wherein

when the piston 21 reaches the left end or the right end, the differential pressure piston is made to move by the piston 21 to switch an open/close state of the two-way pilot valves 100, 101, enabling performance of reverse operation through fluid pressure of the fluid path."

(4) A4

A. There are the following statements in A4, which is a publication distributed before the retroactive filing date of the case.

(A)

"BACKGROUND OF THE INVENTION

I. Field of the Invention

This invention relates, in general, to fluid operated, expansible chamber cylinders and, more specifically, to position sensors for fluid operated, expansible chamber cylinders." (Column 1, lines 8 to 13)

(B)

"Since it is often necessary to know when the piston has moved to the fully extended or retracted travel position before the next step in the machine sequence can take place, limit switches have been used to contact the external end of the piston rod or the connected work component at the end of piston travel." (Column 1, lines 26 to 31)

(C)

"Referring now to the drawing, and to Fig. 1 in particular, there is illustrated a fluid operated, expansible chamber cylinder 10 having a position sensor mounted in a mounting apparatus constructed in accordance with the teachings of the present invention. As is conventional, the fluid operated cylinder 10 includes a hollow

cylindrical housing 12, typically having a circular cross section." (Column 3, lines 8 to 15)

(D)
"Recessed internal cavities 18 and 20 are respectively formed in the first and second end plates 14 and 16 and communicate with the interior of the cylinder housing 12 to form a sealed internal chamber 22." (Column 3, lines 18 to 22)

(E)
"A piston 30 is slidingly disposed within the chamber 22 and is axially movable from one end to the other within the chamber 22." (Column 3, lines 27 to 29)

(F)
"In operation, as is well known, a pressurized fluid, such as compressed air or hydraulic oil, may be admitted through the inlet bore 26 into the chamber 22 of the cylinder 10 by means of control valves, not shown. The pressurized fluid acts upon the rear face 42 of the piston 30 to move the cylinder piston 30 to the left, as viewed in Fig. 1. When fluid under pressure is admitted through the bore 24 in the first end plate 14, the fluid acts against the front face 34 of the piston 30 to move the piston 30 toward the end plate 16, thereby retracting the piston rod 36 into the cylinder 10." (Column 3, lines 41 to 51)

(G)
"A piston position sensor is provided on the cylinder 10. The position sensor, as shown by way of example by reference number 50, in Fig. 1, is typically mounted in a bore 52 formed in the end plate 14." (Column 3, lines 52 to 55)

(H)
"Finally, a plunger type switch, such as shown at 100 in Fig. 3, may be mounted within the bore 52 to detect by actual contact the presence of the cushion plug 32 at the end point of piston travel." (Column 3, line 66 to column 4, line 2)

(I)
"Referring now to Fig. 3, the plunger-type switch 100 is illustrated. The switch 100 is adapted to utilize an air valve sensor. The switch 100 includes a housing 121 having a step bore 125, the lower end of which is cylindrically shaped and adapted to extend into the cylinder bore 52 in the same manner as the sensor 62 described hereinbefore. The lower portion 127 of the housing 121 slidably supports a plunger 126 which is adapted to engage the cushion 32 and be moved upwardly against the bias of a spring 128 disposed within the interior of the housing 121. The upward movement of the plunger 126 permits communication between air ports, one of which is designated by reference numeral 130, in the conventional manner to a suitable sensing device to establish that the piston 30 has moved to a desired position." (Column 5, lines 11 to 26)

(J) Figs. 1 and 3

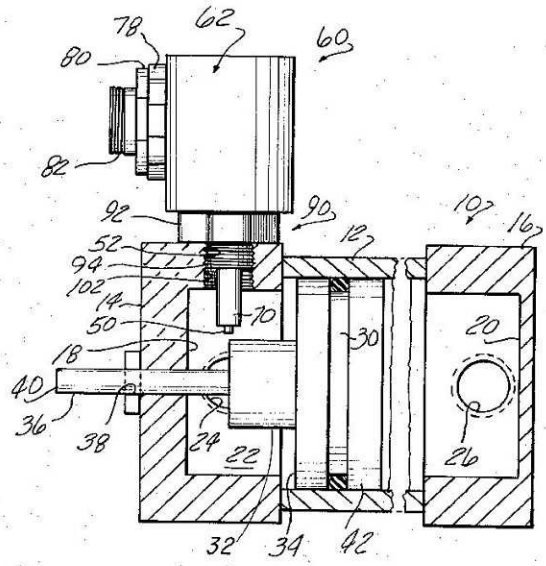


FIG-1

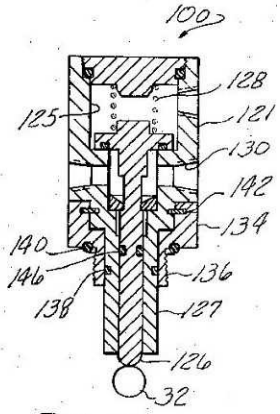


FIG-3

B. A4 matter

Putting together the above-mentioned extracted matters (A) to (I) and the illustration of (J) while taking the common general technical knowledge in consideration, there is described in A4 the following A4 matter.

"A cylinder 10, comprising: the cylinder 10; a piston rod 36 mounted in the cylinder 10 in a manner capable of moving forward and backward; and a space for pressurized fluid, such as compressed air or pressurized oil, for driving the piston rod 36 toward at least one of the moving-forward side and the moving-backward side, wherein a plunger-type switch 100 for contacting a cushion plug 32 formed in the piston 30 at a stroke end of the piston stroke is provided for detection."

(5) A5

A. There are the following statements in A5, which is a publication distributed before the retroactive filing date of the case.

(A)

"This invention relates to a novel actuator valve for reversing the travel of a piston in a cylinder, and more particular, to an actuator valve unit adapted for installation at each end of a double acting cylinder for automatically reciprocating a piston thereof by merely supplying the valves with control fluid." (Column 1, lines 9 to 14)

(B)

"The valve member 62 is moved between the positions illustrated in FIGURES 2 and 5 of the drawings by a generally cylindrical actuator rod 75 having an end portion 76 slidably received through an opening 77 in the end cap 52 and projecting through a bore 78 in the plate 45 into the interior of the cylinder 10. The rod 75 is slidably received in an axial bore 80 of the valve member 62. A collar 81 having a generally annular spring seat 82 is secured to an opposite end portion (unnumbered) of the rod 75 positioned in a counterbore 83 of the valve member 62. A spring 84 seated against the annular seat 82 of the collar 81 and a seat 85 of the end cap 47 normally urges the actuator rod 75 to the

position illustrated in FIGURE 2 of the drawings. The spring 84 likewise urges the valve member 62 to the position illustrated in FIGURE 2 of the drawings by the contact between the collar 81 carried by the rod 75 and an annular wall or surface 86 of the counterbore 83." (Column 3, lines 55 to 72)

(C)
"As the piston 34 continues its movement, the abutment means 87 of the rod 75 contacts the annular wall 88 of the valve member 62 and urges the valve member 62 from the position illustrated in FIGURE 2 to the position shown in FIGURE 4 against the biasing force of the spring 84. During this movement of the valve member 62, the O-ring 60 breaks sealing contact with the housing 46, and the first chamber 56 is placed in fluid communication with the second chamber 63 through the passages 64, 65, as shown in FIGURE 4. The fluid in the left chamber 16 of the valve 11 now begins to vent through the conduit 30, the inlet port 31, the groove 55, the passages 57, 58, the first chamber 56, the passages 64, 65, and the second chamber 63.
At this point the chamber 63 is not fully open to atmosphere through the passages 67, 68, the groove 70 and the exhaust port 71, as illustrated in FIGURE 4 of the drawings. In this position, the tubular end portion 66 of the valve member 62 occupies an intermediate position in which a portion thereof overlies and is minutely spaced from the housing portion defining the passages 67, 68. Thus, restricted flow occurs outwardly of the second chamber 63, the restriction being present between the housing 46 and the tubular end portion 66, the passages 67, 68, the groove 70 and the exhaust port 71. This restriction causes a delay in the opening of the second chamber 63 to the atmosphere until such time as pressure builds up in the chamber 63 to a sufficient extent to rapidly move the valve member 62 to the second position (FIGURE 5) to fully open the chamber 63 to atmosphere." (Column 4, line 52 to column 5, line 6)

(D)
"With the valve member 22 shifting to the left as viewed in FIGURE 1, high pressure from the central chamber 17 of the valve 11 enters the interior of the cylinder 10 to the right of the piston 34 through the port 23 and the conduit 35. This high pressure begins moving the piston 34 to the left (FIGURE 5) and enters the third chamber 94 through the bore 92 in the rod 75. As the high pressure enters the chamber 94, it augments the biasing force of the spring 84 and shifts the valve member 62 from the position shown in FIGURE 5 to the position illustrated in FIGURE 2 to again prevent communication between the first chamber 56 and the second chamber 66 and thus condition the actuator valve 40, as well as the actuator valve 41, for subsequent cycling identical to that just described." (Column 5, lines 18 to 32)

(E) Figs. 1 and 2

FIG.1

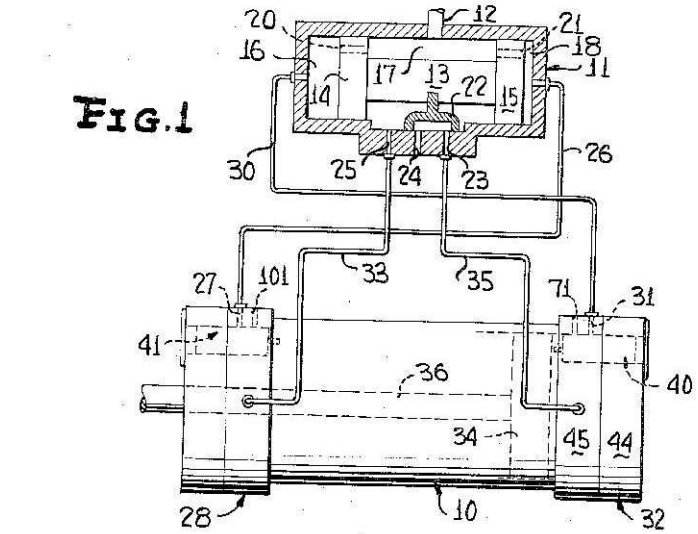
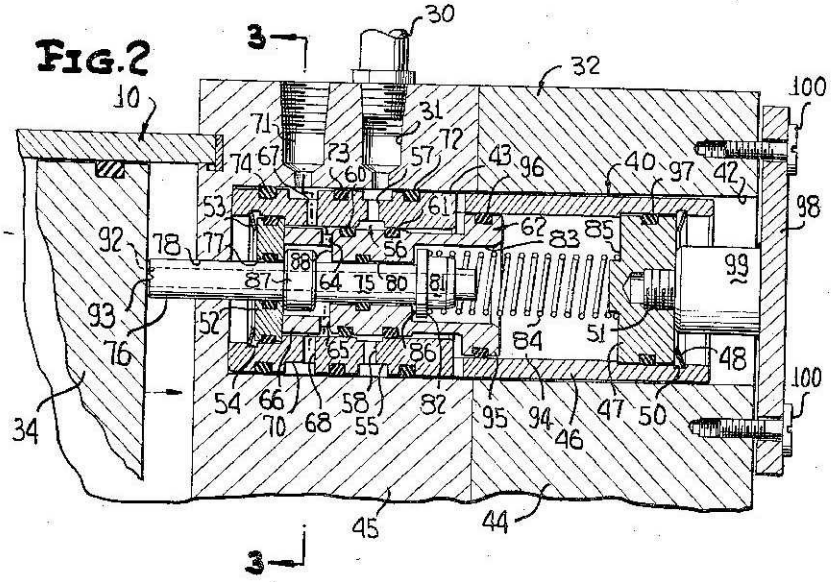


FIG.2



B. A5 matter

Putting together the above-mentioned extracted matters (A) to (D) and the illustration of (E) while taking the common general technical knowledge into consideration, there is described in A5 the following A5 matter.

"An actuator valve unit in which, by a piston 34 pressing a rod member 75, the rod 75 moves a valve member 62 to switch an open/close state of the valve member 62, thereby performing opening and closing of flow paths between a first chamber 56, a second chamber 63, passages 57, 58, 64, 65, an inlet port 31, and an exhaust port 71."

(6) A6

A. There are the following statements in A6, which is a publication distributed before the retroactive filing date of the case.

(A)

"ABSTRACT OF THE DISCLOSURE

A double-acting hydraulic actuator having finger locks to restrain the piston in the retracted position, and an internally mounted slider valve for affecting the movement of a locking piston to selectively hold the finger locks in their locking position." (Column 1, lines 12 to 17)

(B)

"The cylinder formed by the cylindrical housing 22 and the pressure cap 16 is divided into first and second pressure chambers 34 and 36 by a main or actuator piston 32, which can be formed as an integral part of the piston rod 12. An O-ring seal 33 fitted into an outer groove on the periphery of the piston 32 pressure-seals the chambers 34, 36 from each other. The closed end of the cylindrical housing 22 includes a plurality of fluid connecting passages; one passage 31 connects a supply of operating fluid (not shown) to the pressure chamber 34, and a second fluid passage 38 opens into an unloading cylinder 39. Referring additionally to FIGURE 2, the unloading cylinder 39 includes a sleeve 41 and slider valve 42 assembled into a bore at the closed end 84 of the cylindrical housing 22. A hexagon shaped plug 44, threadably inserted into the cylindrical housing 22, holds the sleeve 41 and slider valve 42 in place to align the fluid passage 38 with openings in said sleeve. Two O-ring seals 46, 47 fitted into grooves in the slider valve 42 divide the unloading cylinder 39 into pressure chambers 48, 49 which will be discussed below." (Column 2, lines 36 to 56)

(C)

"To insure that the actuator piston 32 will be maintained in its fully retracted position, as shown in FIGURE 1, the two pressure chambers 34 and 36 are preferably opened to a reservoir (not shown). The pressure chamber 36 is connected to the reservoir by means of a fluid passage 37 which extends from the capped end of the cylindrical housing 22 to the passage 38; the passage 38 in turn is in communication with port 88. The pressure chamber 34 is connected to the reservoir by means of a fluid passage 31 which is in communication with a port 89. Appropriate return lines (not shown) in turn connect the ports 88, 89 to the reservoir through the aforementioned selector valve. The chamber 59 of a locking cylinder 51 is connected to the port 88 and in turn to the reservoir by means of passageways in the slider valve 42 when the valve is in its retracted position, said passageways being shown in greater detail in FIGURE 2. Referring to FIGURE 2, with the actuator piston 32 in its fully retracted position, the slider valve 42 is forced to its fully retracted position by direct contact with the actuator piston 32. With the slider valve 42 fully retracted, a small annular chamber 71 in said slider valve is in communication with chambers 72, 73 of the sleeve 41, as shown in FIGURE 3. At the same time, the axial passage 74 remains open into the chamber 49, but the transverse passage 76 is sealed by the sleeve 41 as shown in FIGURE 5. The fluid connection from the locking chamber 59 to the reservoir, when the actuator piston 32 is fully retracted, is by means of passages 40, 73, 71, 72, and 38. Since both sides of the piston 53 are connected to the reservoir, a transient pressure change in the system will not inadvertently unlock the actuator piston 32." (Column 3, lines 39 to 70)

(D)

"To move the piston 32 to its fully extended position, the pressure chamber 34 is

subjected to pressurized fluid through the aforementioned selector valve, while the pressure chamber 36 remains open to the reservoir return line. With the pressure chamber 34 connected to a source of fluid pressure, the pressure therein will become greater than that in the pressure chamber 36. In spite of the pressure differential initially established across the piston 32, it will be restrained from moving because the locking fingers 66 remain engaged with the annular detent 52. As described above, so long as the piston 32 remains in its fully retracted position, the pressure in the locking chamber 59 will be the same as that existing in chamber 36 and in the reservoir. Thus, by connecting the pressure chamber 34 to a source of operating fluid and the chamber 59 to the reservoir, a differential pressure is developed across the piston 53 which eventually overcomes the force of the compression spring 63, and the piston 53 is moved to its retracted position. As the boss 82 on the piston 53 moves to the right past the annular recess 52, the locking fingers 66 are free to be extracted therefrom in response to the force exerted by fluid in the chamber 34 acting on the piston 32 which tends to pull the fingers 66 to the left. Once the fingers 66 are pulled from the recess 52, the differential pressure developed across the piston 32 will cause said piston to continue to move until it reaches its extended position. Movement of the piston 32 to its extended position releases the slider valve 42, and it will be forced from the retracted position by the fluid pressure in the pressure chamber 49. Although both the front and back faces of the slider valve 42 are exposed to the same pressure, positive movement of the slider valve is assured, since the back of the slider valve has a larger surface area than the front. The fully extended position of the slider valve 42 is determined by the structural configuration of the sleeve 41." (Column 3, line 71 to column 4, line 31)

(E)
"Referring to FIGURE 6, the slider valve 42 is shown in its fully extended position. In this position, the pressure in the locking chamber 59 is equal to the pressure in the chamber 34, since the transverse passage 76, of the slider valve 42, lines up with the second passage of the chamber 73, as shown in FIGURE 9. The annular passage 71 that previously provided communication between the locking chamber 59 and the reservoir, when the piston 32 was in its locked position, is now sealed off as shown in FIGURE 7. Also, the chamber 72 is isolated from the chamber 73 by the slider valve 42, as shown in FIGURE 8." (Column 4, lines 32 to 42)

(F) Figs. 2, 3, and 6

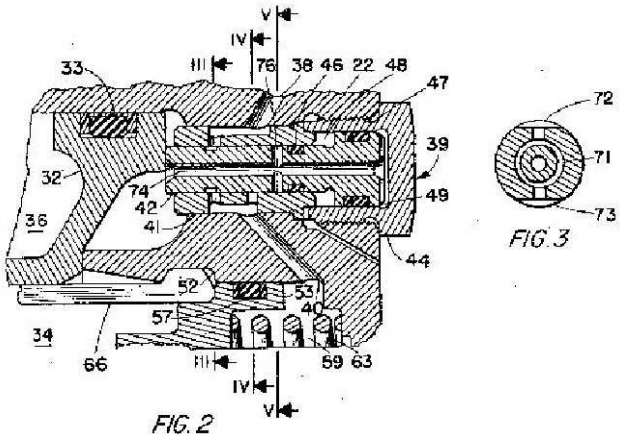


FIG. 2

FIG. 3

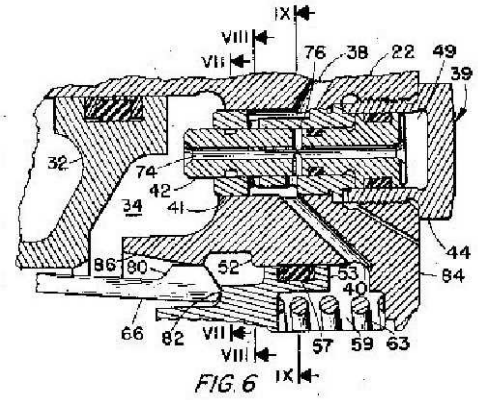


FIG. 6

B. A6 matter

Putting together the above-mentioned extracted matters (A) to (E), and the illustration of (F) while taking the common general technical knowledge into consideration, there is described in A6 the following A6 matter.

"A double-acting hydraulic actuator in which, when an actuator piston 32 is fully retracted, the actuator piston 32 contacts with a slider valve 42 to move the slider valve 42 also to its fully retracted position; and on that occasion, changes occur in open/close states and connections of flow paths between an annular chamber 71, chambers 72, 73 of a sleeve 41, an axial passage 74, a chamber 49, a transverse passage 76, and flow paths 38, 40, and 71 to 73."

(7) A7

A. There are the following statements in A7, which is a publication distributed before the retroactive filing date of the case.

(A)

"[0001] [Industrial Application Field] The present invention relates to a clamping/unclamping confirmation apparatus to confirm a clamped/unclamped state of a workpiece to be secured to a workpiece fixture tool on a palette."

(B)

"[0046] The jig body 51, axis body 53, clamp member 50, piston 54, and spring 55 are similar to those of the second example shown in Fig. 3, and the clamp member 50

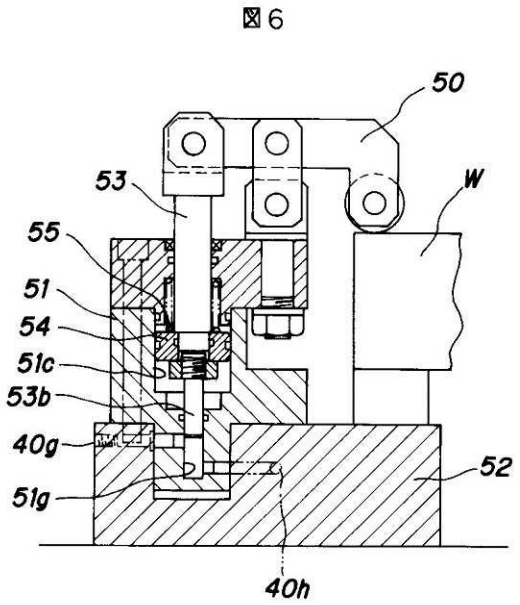
moves up and down by pressure supply to a cylinder chamber 51c and by the spring 55. In this example, an airtight chamber 51g is provided on the axis line of the axis body 53 of the block 52, and the unclamped state is detected by blocking coupling between the conduit opening 40g, which makes the pressure supply source and the airtight chamber 51g communicate with each other, and the conduit opening 40h, which makes the atmospheric pressure side and the airtight chamber 51g communicate with each other, by up-and-down motion of the axis body 53.

[0047] Without being limited to the aforementioned examples, the present invention should just be one having a structure in which a pressure change caused by coupling and blocking a conduit opening in communication with the pressure supply source side and a conduit opening in communication with the atmospheric pressure is detected using movement of a moving portion caused when performing a clamp/unclamping operation of a workpiece fixture jig. In addition, this detection may detect both the clamped state and the unclamped state, or one of these.

[0048]

[Advantage of the Invention] According to a clamping/unclamping confirmation apparatus of the present invention, the clamping/unclamping confirmation apparatus is of a simple configuration in which conduit openings coupling inside the airtight chamber are blocked by making a plunger unit inside the airtight chamber be pressed and moved by movement of a movable portion of a workpiece fixture jig, and a pressure change of pressure fluid caused by this is detected. Therefore, a clamped/unclamped state can be detected certainly with high reliability."

(C) Fig. 6



B. A7 matter

When the above-mentioned extracted matters (A) and (B), and the illustration of (C) are put together while taking the common general technical knowledge into

consideration, there is described in A7 the following A7 matter.

"A clamping/unclamping confirmation apparatus to detect a clamped or unclamped state by making coupling between a conduit opening 40g, which makes a pressure supply source and an airtight chamber 51g communicate with each other, and a conduit opening 40h, which makes an atmospheric pressure side and an airtight chamber 51g communicate with each other, by an axis body 53 moving up and down according to a change in a clamped/unclamped state."

(8) A9
A. There are the following statements in A9, which is a publication distributed before the retroactive filing date of the case.

(A)
"FIG. 1 illustrates a hydraulic control device of an electric disconnector, partially shown as a block diagram, and partially shown as a longitudinal sectional view, with two different switching positions of a seated-type valve above each other and separated by the central axis,

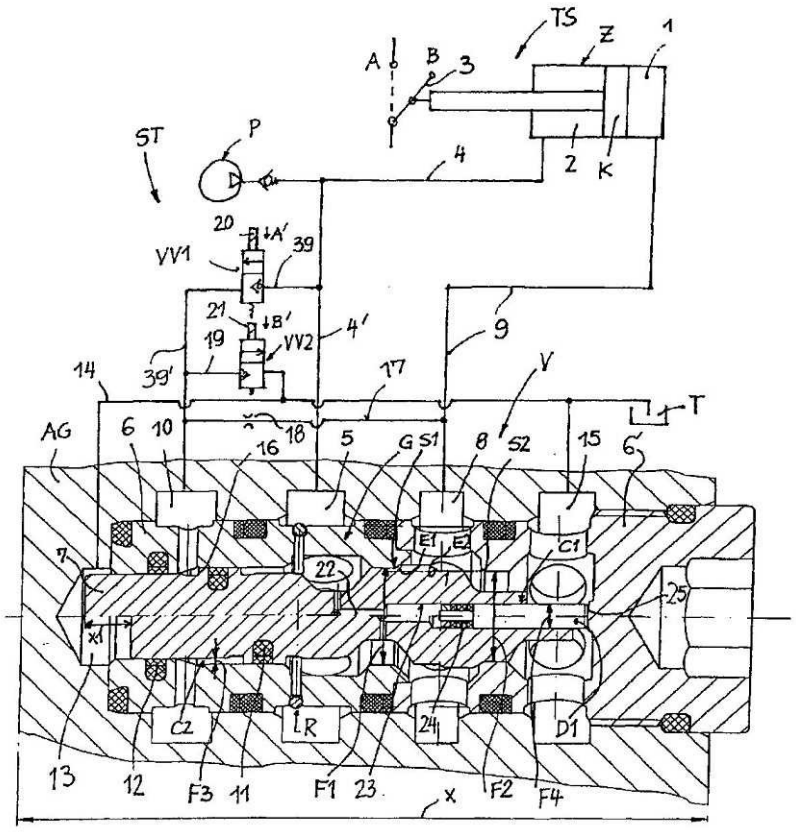
FIG. 2 is a longitudinal sectional view corresponding to the longitudinal sectional view of Fig. 1 of a further embodiment of the seated-type valve, showing two different switching positions separated by the central axis, and

FIG. 3 is a longitudinal view of a further embodiment in both switching positions." (Column 3, lines 46 to 56)

(B)
"The chamber 2 is directly connected via a pressure line 4 with a pressure source P, e.g. a charging pump. A pressure line 4 branches off from pressure line 4 and leads to a pump port 5 in a housing G of a seated-type valve V.

In the embodiment shown, the seated-type valve V has an outer housing AG into which the housing G is screwed. The housing G is formed, e.g, by two sleeve-like housing parts 6, 6' set behind each other. The housing parts 6, 6' consist at least partially of. e.g., hardened steel. A slider closure element 7 is slidably provided in sealed fashion within the housing G and can be displaced between two positions (upper half, left end position, lower half, right end position). A cylinder port 8 is provided in the housing G adjacent to the pump port 5 and separated by a pump valve seat S1 from the pump port 5. A pressure line 9 leads from cylinder port 8 to the chamber 1. A pressure line 39 branches off from pressure line 4' and leads via a solenoid actuated pilot control valve V, V1 and a further pressure line 39' to a control port 10 extending into the interior of the housing. A guiding section of the slider closure element 7 is located in this area and is equipped with two spaced apart sealings 11, 12. The free end at the left side of the slider closure element 7 projects into a chamber 13 connected by a line 14 with a tank T. A tank valve seat S2 separates the cylinder port 8 in the housing G from a tank port 15 which is connected to the tank line 14." (Column 4, lines 12 to 37)

(C) Fig. 1



B. A9 matter

When the above-mentioned extracted matters (A) and (B), and the illustration of (C) are put together while taking the common general technical knowledge into consideration, there is described in A9 the following A9 matter.

"An oil pressure controller, wherein a housing part 6' to house a slider closure element 7 is formed as a cap member inserted into and screwed with a hole formed in an outer housing AG, the housing part 6' having a part of a passageway, through which fluid flows, formed in it"

(9) A10

A. There are the following statements in A10, which is a publication distributed before the retroactive filing date of the case.

"[Example 3]

[0069]

... As shown in Fig. 10, in this clamping device CB, the valve mechanism 105 is abbreviated, and, in the upper end of the lower body member 12, there are formed a pressurized air blowout hole 120 opening at a portion opposite to a locking flange 62a of the cyclic pressure receiving member 5, and an air passage 121 coupled to this pressurized air blowout hole 120.

[0070]

In the upper part body member 11, there are formed air passages 122, 123,

which are different from the air passage 82 for the seating sensor 80, the air passages 122, 123 being coupled to the air passage 121. In the base part body member 13, there is formed an air passage 124 coupled to the air passage 123, this air passage 124 being connected to a pressurized air supply source, and there is also provided a pressure switch 125 to detect that air pressure of pressurized air within the air passage 124 exceeds a set pressure.

[0071]

When the cyclic pressure receiving member 5 moves down to the lower limit position due to a clamping failure, the pressurized air blowout hole 120 is closed by the locking flange 62a, and, therefore, the pressure rise of that pressurized air is detected by the pressure switch 125, enabling detection of the clamping failure. Since the valve mechanism 105 is abbreviated, it will be a clamping failure detection mechanism 100A of a simple configuration.

[Example 4]

[0072]

... As shown in Fig. 11, in this clamping device CC, the valve mechanism 105 is abbreviated, and, in the upper part body member 11, there are formed a pressurized air blowout hole 130 formed in the lower end of the peripheral wall part of the round shape concave portion 6, and air passages 131, 132.

[0073] In the base part body member 13, there is formed an air passage 133 coupled to the air passage 132, this air passage 133 being connected to a pressurized air supply source, and also provided is a pressure switch 134 to detect that the air pressure of pressurized air within the air passage 133 exceeds a set pressure. When the cyclic pressure receiving member 5 moves down to the lower limit position due to a clamping failure, the pressurized air blowout hole 130 is closed by the locking flange 62a, and, therefore, the pressure rise of that pressurized air is detected by the pressure switch 134, enabling detection of the clamping failure. Since the valve mechanism 105 is abbreviated, it will be a clamping failure detection mechanism 100B of a simple configuration. Meanwhile, it may be configured such that, when the cyclic pressure receiving member 5 moves down to a neighborhood position of the lower limit position, the pressurized air blowout hole 130 is closed."

B. A10 matter

When the extracted matters of the above-mentioned A. are put together while taking the common general technical knowledge into consideration, there is described in A10 the following A10 matter.

"A clamping device in which pressurized air blowout holes 120, 130 of air passages 121, 131 that are open when not being clamped are closed by a locking flange 62a of a cyclic pressure receiving member 5 when the cyclic pressure receiving member 5 moves down to the lower limit position."

(10) A11

A11 is a publication that was distributed before the date of the Application of the case (Jul. 5, 2013) and after the retroactive filing date of the case (Oct, 7, 2011), and is a public publication concerning the Original Application.

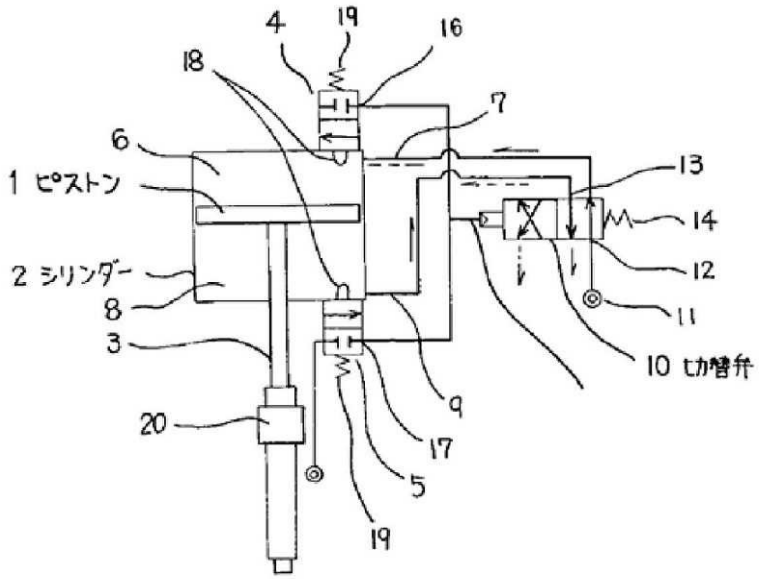
(11) A12
A. There are the following statements as to a switching device of a reciprocating pump in A12, which is a publication distributed before the retroactive filing date of the case, as well as drawings.

(A)
" ... Instead of a mechanical one, a method like that illustrated in Fig. 2 to activate an air pressure valve in response to a motion of an operating body to switch a switching valve by its pilot air has been also taken. In this case, when the switching valve stops at the neutral position by freezing and the like even if the air pressure valve is being activated, a switching failure is generated like the above, posing a problem for the work." (The description, page 2, line 7 from the bottom to the last line)

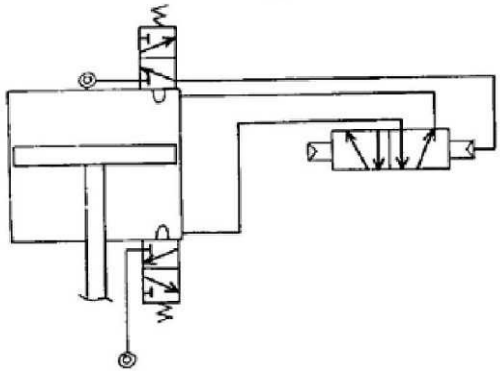
(B)
"The present device is a device in which: on-off valves that, when a reciprocating operating body reaches switching positions at the both ends, perform opening actuation, and, when departing from the both ends, are occluded by springs arranged at the respective ends; the entrance route of one of the on-off valves is connected to an air source and the entrance route of the other is made to be open to the atmosphere; and a switching valve to introduce compression air to respective driving chambers formed in either side of the operating body is made to be a four-port two-position switching valve with a spring, wherein this switching valve is of a pilot air actuation type in which switching is performed by receiving compression air from the on-off valve, and the route of the pilot air and the exit route of the on-off valve are made to communicate each other." (The description, page 4, lines 1 to 12)

(C) Fig. 1 and Fig. 2

第 1 図



第 2 図



１	ピストン	1 Piston
２	シリンダー	2 Cylinder
１０	切替弁	10 Switching valve

B. A12 matter

When the above-mentioned extracted matters (A) and (B) and the illustration of (C) are put together while taking the common general technical knowledge into consideration, there is described the following A12 matter in A12.

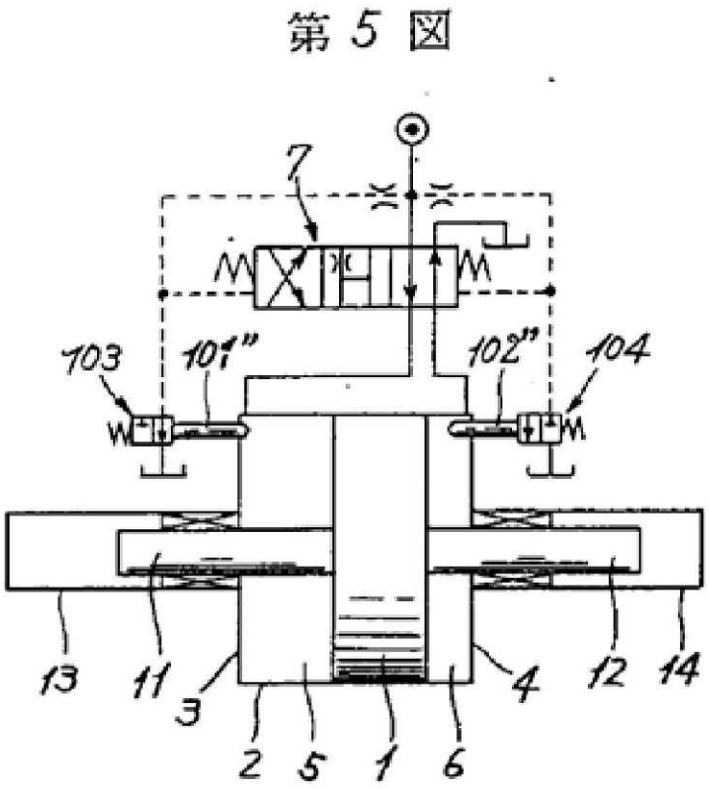
"A point that, although it is supposed conventionally that, in a switching device of a reciprocating pump, a switching valve is switched by pilot air as shown in Fig. 2, it is made such that, as is the case with one described in Fig. 1: on-off valves that, when a reciprocating operating body reaches switching positions at the both ends, perform opening actuation by actuation pieces, and, when departing from the both ends, are occluded by springs arranged at the respective ends; the entrance route of one of the on-off valves is connected to an air source and the entrance route of the other is made to be open to the atmosphere; and a switching valve to introduce compression air to

respective driving chambers formed in either side of the operating body is made to be a four-port two-position switching valve with a spring, wherein this switching valve is of a pilot air actuation type to perform this switching, and the route of the pilot air and the exit route of the on-off valve are made to communicate with each other."

(12) A13
A. In A13, which is a publication distributed before the retroactive filing date of the case, there are the following statements as to a stroke end detection device of a reciprocating pump along with drawings.

(A)
" ... As shown in Fig. 5, it is made such that abutting members 101", 102" activate direction switching valves 103, 104 by abutting against the low pressure piston 1 to make the direction control valve 7 be activated while taking the fluid of the direction switching valves 103, 104 as a pilot." (The description, page 4, line 7 from the bottom to line 3 from the bottom)

(B) Fig. 5



B. A13 matter
When the above-mentioned extracted matters (A) and the illustration of (B) are put together while taking the common general technical knowledge into consideration, there is described in A13 the following A13 matter.

"A stroke end detection device of a reciprocating pump in which a passageway supplied with a pressure fluid and a passageway in communication with the outside world are

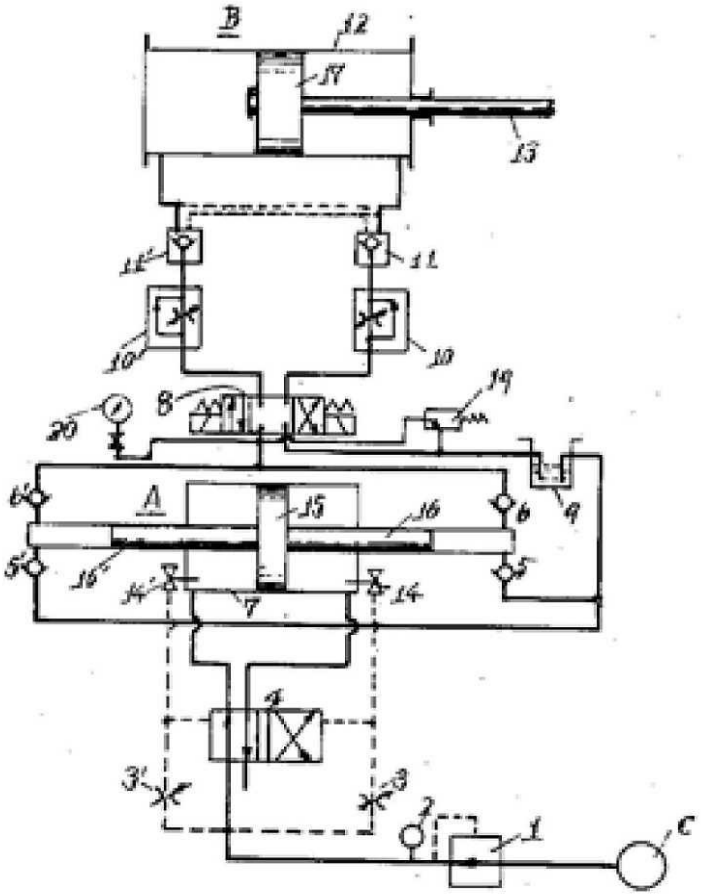
made to be communicated with each other by opening and closing of a direction switching valve."

(13) A14

A. In A14, which is a publication distributed before the retroactive filing date of the case, there are the following statements as to a boosting driving apparatus of a valve due to conversion and pressure boosting of the actuation fluid, along with a drawing.

(A)
"When the piston 15 reaches an end point of its stroke, it contacts a working rod of the pilot valve 14 to open the pilot valve 14, releasing the air within the pipe to the ambient air." (Page 2, upper left column, lines 13 to 16)

(B) Figure



B. A14 matter

When the above-mentioned extracted matter (A) and the illustration of (B) are put together while taking the common general technical knowledge into consideration, there is described in A14 the following A14 matter.

"A boosting driving apparatus of a valve due to conversion and pressure boosting of the actuation fluid, in which a passageway to which pressure fluid is supplied and a

passageway in communication with the outside world are made to communicate with each other by opening and closing of the pilot valve 14."

(14) A17

There is the following description in A17, which is a publication distributed before the retroactive filing date of the case, as to oil pressure equipment and an application circuit.

"9.5.1 Cycling speed

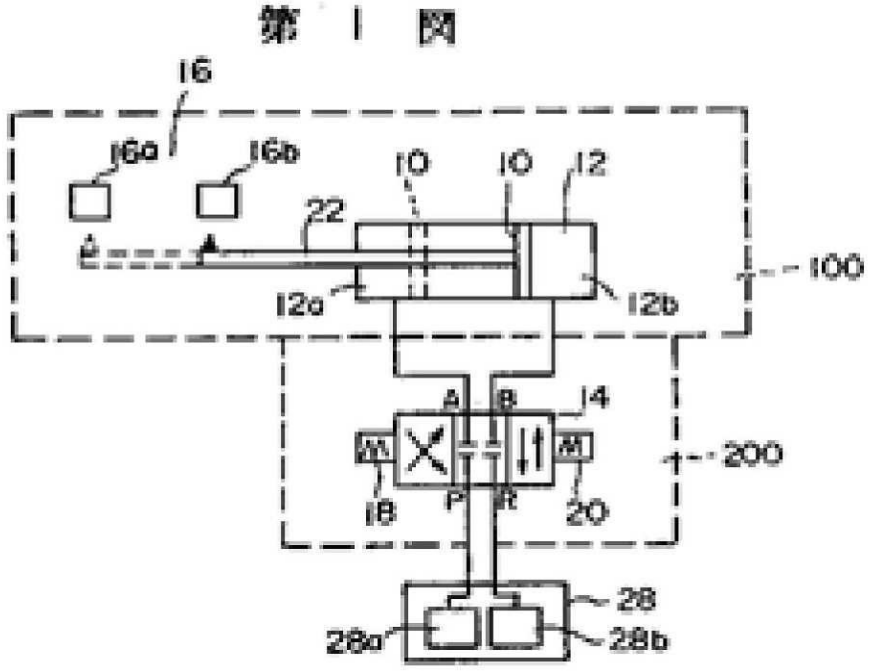
In order to make a cycling speed of a hydraulic cylinder smooth and faster, a pilot-operated oil pressure four-way valve using air pressure as pilot pressure should be used." (Page 235, lines 9 from the bottom to line 5 from the bottom)

(15) A18

A. In A18, which is a publication distributed before the retroactive filing date of the case, there is the following statement about a cylinder apparatus.

(A) "A piston 10 is controlled while detecting a position of the piston 10 in a cylinder body 12 by a position detector 16." (Page 1, the right column, lines 9 to 11)

(B) Fig. 1



B. A18 matter

When the above-mentioned extracted matter (A) and the illustration of (B) are put together while taking the common general technical knowledge into consideration, there is described the following A18 matter in A18.

"A point that a position of a piston 10 in a cylinder body 12 is detected by a position

detector 16."

2. Examination as to Reasons for invalidation

(1) Reason for invalidation 1
A. Regarding the Patent Invention 1

(A) Comparison with A1 invention

The Patent Invention 1 and the A1 invention will be compared.

It is obvious that "the cylinder body 10" and "the hydraulic power actuator A" of the A1 invention correspond to "a cylinder body" and "a hydraulic cylinder" of the Patent Invention 1 as seen from their configurations and functions. The "piston 15 and the piston rod 16" of the A1 invention correspond to "an outputting member" of the Patent Invention 1 from the statement of " ... for actuating an operatively associated piston 15 therein for reciprocable movement, this piston being connected with a power delivery piston rod 16 which is carried through a suitable bushing in the end cap 12 where it is provided with appropriate coupling means for connecting to the device to be operated thereby." of the above-mentioned extracted matter (C).

"The pilot valve B activated when the piston 15 and the piston rod 16 reach the end of the retracted stroke" of the A1 invention has a commonality with "a position detecting apparatus for detecting a position of an outputting member" of the Patent Invention 1 in a point that they are devices to operate when "an outputting member" reaches a predetermined position.

"The pilot valve B" and "the spool valve 29" of the A1 invention respectively correspond to "an opening/closing valve mechanism" and "a valve body" of the Patent Invention 1. Then, "the valve body 21" of the A1 invention has a commonality with "a cylinder body" of the Patent Invention 1 in a point that these are a housing part of "an opening/closing valve mechanism". Then, "a flow path, formed in the valve body 21, to connect a port 26 and 27; a flow path formed in the valve body 21, to connect the port 26 and a port 28; and a pilot valve B capable of switching the flow paths by opening and closing the flow paths" of the A1 invention has a commonality with "an air passage formed within the cylinder body, the air passage having one end supplied with pressurized air and another end in communication with the outside world; and an opening/closing valve mechanism capable of performing opening and closing of the air passage" of the Patent Invention 1 in a point that they are "an opening/closing valve mechanism capable of opening and closing a flow path formed in a housing part, through which fluid is flowing". The "end cap 11" of the A1 invention has a commonality with a "cylinder body" of the Patent Invention 1 in a point that they are a mounting member in which a mounting hole into which "the pilot valve B" is mounted in a manner capable of moving forward and backward is formed. The "bore extension 33" and "the axial bore passage 48" of the A1 invention respectively correspond to "an oil pressure introducing chamber" and "an oil pressure introducing passage" of the Patent Invention 1.

Since "an end of its retracted stroke" of the A1 invention is a position within a predetermined range that the piston 15 and the piston rod 16 reach, it corresponds to "a predetermined position" of the Patent Invention 1. A "cam member 43 provided in the piston 15" of the A1 invention has a commonality with an "outputting member" of the

Patent Invention 1 in a point that they are each a driving member to make a valve body move.

Then, the Patent Invention 1 and A1 invention are identical and different in the following points.

<Corresponding features>

"A device configured to be activated when, in a hydraulic cylinder having a cylinder body, an outputting member mounted in the cylinder body in a manner capable of moving forward and backward, and a hydraulic chamber for driving the outputting member toward at least one of a moving-forward side and a moving-backward side, a position of the outputting member is reached, the device comprising:

a flow path, formed within a housing part, through which fluid flows; and an opening/closing valve mechanism capable of opening and closing this flow path, wherein

the opening/closing valve mechanism comprises: a valve body mounted in a mounting hole formed in a mounting member in a manner capable of moving forward and backward; an oil pressure introducing chamber configured to hold the valve body in an advanced state to a side of the outputting member; and an oil pressure introduction passage to make the hydraulic chamber and the oil pressure introduction chamber communicate with each other, and wherein,

when the outputting member reaches a predetermined position, the valve body is moved by a driving member to switch an open/close state of the opening/closing valve mechanism."

<Different feature 1>

A point that, regarding "a flow path" and "an opening/closing valve mechanism" of the above-mentioned corresponding feature, both the flow path and the opening/closing valve mechanism are provided in the cylinder body in the Patent Invention 1, whereas, in the A1 invention, the flow path is provided in the valve body 21, and the pilot valve B is provided in the end cap 11.

<Different feature 2>

A point that, regarding the oil pressure introduction chamber and the oil pressure introducing passage of an opening/closing valve mechanism, the oil pressure introduction chamber of the Patent Invention 1 is one in which a state that a valve body has been made to be advanced to the side of the outputting member is held by oil pressure of a hydraulic chamber, whereas, the bore extension 33 of the A1 invention is one to hold the advanced state of the spool valve 29 to the side of the piston 15 and the piston rod 16 by spring force of the spring 35, and it is not clear whether or not the advanced state is held also by oil pressure of a hydraulic chamber.

<Different feature 3>

A point that the Patent Invention 1 is of a detection device to detect a position of an outputting member in a hydraulic cylinder, the device being configured such that: fluid is air; an air passage having one end supplied with pressurized air and the other end in communication with the outside world is provided as a flow path to be opened and closed; and, when the outputting member reaches a predetermined position, the

valve body is moved by the outputting member to switch an open/close state of the opening/closing valve mechanism, enabling detection of arrival of the outputting member to the predetermined position through an air pressure of the air passage, whereas, in the A1 invention: it is not clear whether it is a device to detect a position of the piston 15 and the piston rod 16; it is also not clear whether fluid is air or not; and, although a flow path connecting the connecting ports 26 and 27 and a flow path connecting the connecting ports 26 and 28 are provided as flow paths to be opened and closed, and, when the piston 15 and the piston rod 16 reach a predetermined position, the spool valve 29 is made to move by the cam member 43 provided in the piston 15 to switch the open/close states of the pilot valve B, it is not clear whether or not it detects the position of the piston 15 and the piston rod 16.

(B) Examination against the different features

a. Regarding the different feature 1

In A1, there is the statement that "The pilot valve unit and associated cam, as heretofore utilized, were more or less openly exposed with respect to at least a portion of their moving parts. These exposed moving parts were easily susceptible to contamination and lacked proper provision for proper protection against the elements, or for lubricating internal parts. ... The above noted problem as well as others inherent in the presently known conventional arrangements have to a great extent been eliminated by the herein described invention by providing a unitized assembly wherein the cycling pilot control valve is intimately associated with the power actuator in order to provide an integrated unit assembly, wherein the operatively associated moving parts of the actuator and pilot valve will be entirely enclosed, and in which the pilot valve means will be lubricated by the pressurized fluid medium utilized for motivating the actuator." of the extracted matter (B) of the above-mentioned 1.(1)A. Then, the A1 invention is an invention that makes, in an effort to solve the problem point of being easily susceptible to contamination, and lacking proper provision for lubricating internal parts caused because the unit of a conventional pilot valve and the moving part of an associated cam is exposed to the external, the moving part be entirely enclosed by the valve body 21 and the end cap 11. On the other hand, since the Patent Invention 1 is not one that is provided with a configuration for making another valve body different from the outputting member move separately from the piston, such as the cam member 43 of the A1 invention, the Patent Invention 1 and A1 invention are different in configuration to be a premise in the first place, and it cannot be said that there is motivation in providing a flow path and an opening/closing valve mechanism of the A1 invention to the cylinder body 10.

The Demandant alleges that, as has been described in 1.(1)A. in No. 3, there is described in A2, A3, A5, and A6 that an air passage is formed within a cylinder body or in a valve case. However, none of those described in each of these evidences A has a protrusion portion for detecting a position of the piston 15 such as one possessed by the cam member 43 of the A1 invention. Then, among ones having the cam member 43 for position detection of the piston 15 and the end cap 11 covering that like the A1 invention, there is no evidence A having a flow path and the pilot valve B in the cylinder body 10.

Accordingly, it cannot be said that to include the configuration concerning the

aforementioned different feature 1 in the A1 invention could be achieved by a person skilled in the art with ease.

b. Regarding the different feature 2

From the statement that "This fluid being pressurized acts on the opposite end of the spool valve, and would tend to force the valve against the pressure of the spring 35 and thus produce faulty operation. This is prevented by providing an equalizing pressure of fluid at the opposite end of the spool valve through a passageway which connects the source of fluid pressure with the bore extension 33. For convenience, this is accomplished by providing an axial bore passage 48 which interconnects the spaces at the opposite ends of the valve spool and subjects end areas to fluid pressure which balances the valve spool so that the fluid pressure does not interfere with the spool operation." of the extracted matters (G) of the above-mentioned 1.(1)A. of A1, and from the fact that the spool valve 29 is made to move by the cam member 43, it is obvious to a person skilled in the art that the A1 invention is an invention in which, by providing the axial bore passage 48, the respective sides of the spool valve 29 (the hydraulic chamber side and the end cap 11 side) are made to communicate with each other to equalize oil pressure acting on the both sides so as to prevent the operation of the spool valve 29 by the spring 35 and the cam member 43 from being substantially impeded by oil pressure. Also obvious to a person skilled in the art is that, when a difference is caused between oil pressures acting on the respective sides, an oil pressure based on that difference acts on the spool valve 29 to impede the reciprocation of the spool valve 29.

Then, in the A1 invention, the bore extension 33 is held by oil pressure of a hydraulic chamber in a state that the spool valve 29 is made to be advanced to the side of the piston 15, and the piston rod 16 is to make, between oil pressures acting on the both ends of the spool valve 29, the oil pressure in the side of the bore extension 33 be relatively enlarged, and, as a result, traveling of the spool valve 29 by the cam member 43 toward the upper side in Fig. 1 will be impeded due to influence of oil pressure of the hydraulic chamber. Therefore, it should be said that there is an obstructive reason for providing the configuration concerning the aforementioned different feature 2 in the A1 invention.

As has been described in the above-mentioned 1.(1)A. in No. 3, the Demandant alleges that there are described in A3, A5, and A6 ones that respectively make valve bodies move forward only by oil pressure. However, as has been indicated in the above, in the A1 invention, it should be said that there is an obstructive reason for making the spool valve 29 move forward by oil pressure, and, thus, it is not recognized that it is easy for a person skilled in the art to apply the above-mentioned matters described in A3, A5, and A6.

Then, it cannot be said that it could have been achieved by a person skilled in the art with ease to provide the configuration concerning the aforementioned different feature 2 in the A1 invention.

c. Regarding the different feature 3

The A1 invention is one in which, when the piston 15 and the piston rod 16 reach the end of a retracted stroke, the spool valve 29 of the pilot valve B is made to move by the cam member 43 to perform switching between a flow path connecting the ports 26, 27 and a flow path connecting the ports 26, 28, to thereby control so as to

make the piston 15 and the piston rod 16 reciprocate, and, therefore, the spool valve 29 of the A1 invention is a part of operation switching means for switching the flow paths between the ports 26 to 28 to make the piston 15 and 16 perform the reverse operation automatically. Then, there is no rational reason for a person skilled in the art to provide, in an effort to detect that the piston 15 and the piston rod 16 reciprocating automatically reach an end of the retracted stroke, a detection function of arrival of the piston 15 and the piston rod 16 to the end of the retracted stroke into the spool valve 29 that is nothing but a part of the operation switching means.

As described in the above-mentioned 1.(1)A. in No. 3, although the Demandant alleges that there are described ones to detect positions of members driven by a piston in A2, A4, A13, and A18, the spool valve 29 is, as has been indicated above, nothing but a part of operation switching means, and, therefore, even if configurations for detecting a position are described in these Evidences A, it cannot be said that there is motivation for combining those configurations with the A1 invention.

Therefore, it cannot be said that it could have been achieved by a person skilled in the art with ease to provide the configuration concerning the aforementioned different feature 3 in the A1 invention.

d. Summary as to the Patent Invention 1

From the above mentioned reasons, it cannot be said that the Patent Invention 1 is one that could have been invented by a person skilled in the art with ease by applying the A1 invention, the matters described in the other Evidences A, and the conventionally well-known matters.

B. Regarding the Patent Inventions 2 to 7

The Patent Inventions 2 to 7 are inventions that refer to the Patent Invention 1 directly or indirectly, include all the matters specified in the Patent Invention 1, and have further limitation matters that are added. Accordingly, as with the Patent Invention 1, it cannot be said that the Patent Inventions 2 to 7 are ones that could have been invented by a person skilled in the art with ease by applying A1 invention, the matters described in the other Evidences A, and the conventionally well-known matters.

C. Closing as to Reason for invalidation 1

Accordingly, regarding the Patent Inventions 1 to 7, the reason for invalidation 1 advocated by the Demandant is groundless.

(2) Reason for invalidation 2

A. Regarding the Patent Invention 1

(A) Comparison with the A2 invention

The Patent Invention 1 and the A2 invention are compared.

It is obvious that the "cylinder 12" and the "piston rod 26" of the A2 invention respectively correspond to the "cylinder body" and the "outputting member" of the Patent Invention 1 as seen from their configurations and functions.

From the statement of "The cylinder 12 includes a pair of spaced heads 18 and 20 of block like construction" of the extracted matter (D) of the above-mentioned

1.(2)A. of A2, "formed within a head 20" of the A2 invention can be also described as "formed within the cylinder 12". In addition, "the pneumatic valve 16" and "the valve member 46" of the A2 invention respectively correspond to the "opening/closing valve mechanism" and the "valve body" of the Patent Invention 1. Accordingly, "a conduit 56, a conduit 58, and a conduit 64 formed within a head 20 are provided, the conduit 58 having an end supplied with pressurized air, the conduit 64 having an end in communication with the outside world, and a pneumatic valve 16 capable of opening and closing a flow path between the conduit openings 56 and 58 and a flow path between the conduit openings 56 and 64 is provided" of the A2 invention has a commonality with "an opening/closing valve mechanism capable of performing opening and closing of an air passage formed within the cylinder body, the air passage having one end supplied with pressurized air and another end in communication with the outside world" of the Patent Invention 1 in a point that each of these is "an opening/closing valve mechanism capable of opening and closing a flow path which is formed within a cylinder body and through which air flows".

A "space" included in "the pneumatic valve 16" of the A2 invention has a commonality with "oil pressure introducing chamber" of the Patent Invention 1 in a point that these are spaces for holding a "valve body" in a state advanced to the "outputting member" side.

"When the piston rod 26 reaches a predetermined position, the valve member 46 is moved by the piston rod 26 to switch an open/close state of the pneumatic valve 16 between the conduit openings 56 and 58 and between the conduit openings 56 and 64," of the A2 invention corresponds to "when the outputting member reaches a predetermined position, the valve body is moved by the outputting member to switch an open/close state of the opening/closing valve mechanism," of the Patent Invention 1.

Then, the Patent Invention 1 and the A2 invention are identical and different in the following points.

<Corresponding features >

"A position detecting apparatus for detecting a position of an outputting member in a hydraulic cylinder having a cylinder body, the outputting member mounted in the cylinder body in a manner capable of moving forward and backward, and a hydraulic chamber for driving the outputting member toward at least one of a moving-forward side and a moving-backward side, the position detecting apparatus comprising:

an opening/closing valve mechanism capable of opening and closing a flow path which is formed within a cylinder body and through which air flows, wherein

the opening/closing valve mechanism comprises: a valve body mounted in a mounting hole formed in the cylinder body in a manner capable of moving forward and backward; a space for holding the valve body in a state advanced to a side of the outputting member, and wherein,

when the outputting member reaches a predetermined position, the valve body is moved by the outputting member to switch an open/close state of the opening/closing valve mechanism, enabling detection of arrival of the outputting member to the predetermined position through an air pressure of the air passage."

<Different feature 1>

A point that an opening/closing valve mechanism of the Patent Invention 1

includes an oil pressure introduction passage to make a hydraulic chamber and an oil pressure introducing chamber communicate with each other, and a state that a valve body has been made to be advanced to the side of an outputting member is held by oil pressure of the hydraulic chamber, whereas, the pneumatic valve 16 of the A2 invention is not provided with a configuration corresponding to an oil pressure introduction passage, and holds the advanced state by spring force and air pressure within the air passage.

<Different feature 2>

A point that, regarding a flow path that can be opened and closed by a valve mechanism, it is an air passage having one end supplied with pressurized air and the other end in communication with the outside world in the Patent Invention 1, whereas, in the A2 invention, the conduit 58 is supplied with pressurized air at its end, and the conduit 64 is in communication with the outside world at its end, and, the relevant flow paths are a flow path streaming between the conduits 56, 58 and a flow path streaming between the conduits 56, 64.

(B) Examination about the different features

a. Regarding the different feature 1

The valve member 46 of the pneumatic valve 16 of the A2 invention is one in which, by being configured such that pressure of pressurized air continues to act in a direction that the operation tool 44 moves toward inside the cylinder 12, the valve member 46 is held in the advanced state to the side of the piston rod 26, and, on the occasion of retraction of the piston 24, the valve operator 44 is released.

In addition, the pneumatic valve 16 of the A2 invention is a valve in which the conduit 58 is supplied with pressurized air at its end, the conduit 64 is in communication with the outside world at its end, a flow path streaming between the conduit 56 and the conduit 58 and a flow path streaming between the conduits 56, 64 are capable of being opened and closed, and open/close states between the conduits 56, 58 and between the conduits 56, 64 are switched to detect that the outputting member reaches a predetermined position through air pressure of the conduit 56. Therefore, it is a valve that can detect that the outputting member reaches a predetermined position by whether or not pressurized air supplied from the conduit 58 is supplied to the conduit 56 by the pneumatic valve 16.

Accordingly, it can be understood that pressurized air of the A2 invention is one having both a function to continuously press the valve member 46 of a pneumatic valve toward the inside direction of the cylinder 12, and a function being a part of a configuration for informing that the outputting member has reached a predetermined position.

Then, in the pneumatic valve 16 of the A2 invention, to form an oil pressure introduction passage in order to make a hydraulic chamber and a space communicate with each other, and hold the valve member 46 in the advanced state to the side of the piston rod 26 by oil pressure of a hydraulic chamber is to try to replace only the function to press against the valve member 46 out of both the above-mentioned two functions possessed by the above-mentioned pressurized air with oil pressure, and thus it cannot be recognized that motivation to substitute only a component part related to a

part of the functions in that manner exists in the A2 invention.

As has been described in 1.(2)A. of No. 3, the Demandant alleges that, in each of A1 and A3, there is described an invention in which a valve body advances by oil pressure of a hydraulic cylinder. However, as has been described above, in the A2 invention, it is not recognized as there exists motivation to press the valve member 46 by oil pressure in the pneumatic valve 16, and, therefore, it cannot be said that it is easy for a person skilled in the art to apply the matter described in the above-mentioned A1 or A3 to the A2 invention.

As described above, it cannot be claimed that it could have been achieved by a person skilled in the art with ease to make the A2 invention be one including the configuration concerning the aforementioned different feature 1.

b. Regarding the different features 2

"The air passage having one end supplied with pressurized air and another end in communication with an outside world" that is the matter specified in the Patent Invention 1 is one that makes, when an outputting member reaches a predetermined position, the valve body be moved by the outputting member to switch an open/close state of the opening/closing valve mechanism, enabling detection of the outputting member reaching a predetermined position through air pressure of the air passage. Therefore, it can be understood that it is one in which pressure of a whole air passage from one end supplied with pressurized air to the other end in communication with the outside world changes largely between the pressure of pressurized air and the pressure of the outside world by the operation to switch an open/close state of the on-off valve function, and, by detecting the pressure change, it is detected that the outputting member reaches a predetermined position.

On the other hand, as indicated in the above-mentioned a., the pressurized air supplied by the conduit 58 of the A2 invention is one that has both a function to continuously press the valve member 46 of a pneumatic valve toward the inside direction of the cylinder 12, and a function of being a part of a configuration for informing that the outputting member has reached a predetermined position. Then, it is obvious to a person skilled in the art that it is desirable, for the purpose of the former function, not to change pressure of pressurized air of the passageway 58 acting on the valve member 46, while it is also desirable, for the purpose of the latter function, not to change pressure of pressurized air of the passageway 58 similarly because, in the latter function, a target of the detection is a change of air pressure caused between: air pressure that occurs in the conduit 56 when the conduit 56 is connected to the conduit 58 and pressurized air is supplied; and air pressure that occurs in the conduit 56 when the conduit 56 is connected to the conduit 64 and becomes in communication with an outside world.

Then, to make the A2 invention be one provided with the configuration concerning the different features 2 is to try to change the pressure of pressurized air within the passageway 58, which is desirable not to be changed, and, therefore, in this point, it should be said that there exists an obstructive matter against such replacement.

As has been described in 1.(2)A. in No. 3, the Demandant alleges that "it is conventionally well-known to make an air passage supplied with pressurized air and an air passage in communication with the outside world be 'communicated' with each other, from the statements of A3, and A12 to 14". However, as has been described above, to

apply the well-known constitution in question to the A2 invention leads to variation of pressure of pressurized air within the passageway 58, resulting in existence of an obstructive reason, and, therefore, it cannot be said that it is easy for a person skilled in the art to apply the well-known matter in question to the A2 invention.

Accordingly, it cannot be claimed that it could have been achieved by a person skilled in the art with ease to make the A2 invention include the configuration concerning the aforementioned different feature 2.

c. Summary as to the Patent Invention 1

As described above, it cannot be said that the Patent Invention 1 is one that could have been invented by a person skilled in the art with ease by applying the A2 invention, the matters described in the other Evidences A, and the conventionally well-known matters.

B. Regarding the Patent Inventions 2 to 7

The Patent Inventions 2 to 7 are inventions that refer to the Patent Invention 1 directly or indirectly, include all the matters specified in the Patent Invention 1, and have further limitation matters that are added. Accordingly, as with the Patent Invention 1, it cannot be said that the Patent Inventions 2 to 7 are ones that could have been invented by a person skilled in the art with ease by applying A2 invention, the matters described in the other Evidences A, and the conventionally well-known matters.

C. Closing as to Reason for invalidation 2

Accordingly, regarding the Patent Inventions 1 to 7, the reason for invalidation 2 advocated by the Demandant is groundless.

(3) Reason for invalidation 3

A. Regarding the Patent Invention 1

(A) Comparison with A3 invention

The Patent Invention 1 and the A3 invention are compared.

The "low pressure cylinder 20" and "the piston 21 and the high pressure pistons 26, 27" of the A3 invention respectively correspond to the "cylinder body" and the "outputting member" of the Patent Invention 1.

The "two-way pilot valves 63, 64" of the A3 invention correspond to the "opening/closing valve mechanism" of the Patent Invention 1, respectively.

From the statement of "the invention is not limited to pressure boosters but can be applied in the same way to hydraulically or pneumatically operated motors" in the extracted matters (A) of the above-mentioned 1.(3)A. of A3, the A3 invention is an invention that is used with oil pressure or air pressure. Therefore, "the cylinder chambers 22, 23", "continuous-operation piston drive", "pressure fluid", "fluid path", "fluid pressure of a fluid path", and "fluid pressure of the cylinder chambers 22, 23" of the A3 invention are respectively have a commonality with "hydraulic chamber", "hydraulic cylinder", "pressurized air", "air passage", "air pressure of an air passage", and "oil pressure of a hydraulic chamber" of the Patent Invention 1 to the extent that they are the "fluid chamber", "fluid pressure cylinder", "pressurized fluid", "fluid path",

"fluid pressure of a fluid path", and "fluid pressure of a fluid chamber", respectively.

Regarding the collecting container 41 of the A3 invention, fluid that has reached the collecting container 41 never circulates again to the fluid path and never exerts some sort of effect on the constitution of the A3 invention, and, therefore, it corresponds to the outside world of the Patent Invention 1.

The “plunger 65” of the A3 invention has a commonality with the “valve body” of the Patent Invention 1 in a point that they are moving members made to move by an outputting member when the outputting member reaches a predetermined position. Then, on the occasion that such moving member has been made to move to switch an open/close state of an opening/closing valve mechanism, the piston 21 and the high pressure pistons 26, 27 perform the reverse operation in the A3 invention, whereas the Patent Invention 1 is one that is configured in a manner capable of detecting that the outputting member reaches a predetermined position. However, the two have a commonality with each other in a point that these are switching devices to perform a switching operation when an outputting member reaches a predetermined position.

Then, the Patent Invention 1 and the A3 invention are identical and different in the following points.

<Corresponding features>

”A switching device configured to operate at a predetermined position of an outputting member in a hydraulic cylinder having a cylinder body, the outputting member mounted in the cylinder body in a manner capable of moving forward and backward, and a hydraulic chamber for driving the outputting member toward at least one of a moving-forward side and a moving-backward side, the switching device comprising:

a flow path having one end supplied with pressurized fluid and the other end in communication with the outside world; and an opening/closing valve mechanism capable of opening and closing the flow path, wherein,

when the outputting member reaches a predetermined position, the moving member is made to move by the outputting member to switch an open/close state of the opening/closing valve mechanism, and switching operation is performed when the outputting member reaches a predetermined position through fluid pressure of the flow path.”

<Different feature 1>

A point that the Patent Invention 1 is an invention in which a flow path is formed within a cylinder body, an opening/closing valve mechanism comprises: a valve body mounted in a mounting hole formed in the cylinder body in a manner capable of moving forward and backward; an oil pressure introducing chamber configured to hold the valve body in an advanced state to a side of the outputting member by an oil pressure of the hydraulic chamber; and an oil pressure introduction passage to make the hydraulic chamber and the oil pressure introduction chamber communicate with each other, and a moving member that is moved by the outputting member when the outputting member reaches a predetermined position is a valve body, whereas, it is not clear whether a fluid path of the A3 invention is one that is formed within the low pressure cylinder 20, it is also not clear whether it is one that includes: an oil pressure introduction chamber to hold the valve body in a state advanced to the side of the piston 21 and the high pressure pistons 26, 27 by fluid pressure of the main cylinder spaces 22,

23; and a fluid introduction passage to make the main cylinder spaces 22, 23 communicate with each other, and the moving member is the plunger 65.

<Different feature 2>

A point that the Patent Invention 1 is of a position detecting apparatus in which, when an outputting member reaches a predetermined position, a valve body is made to move by the outputting member to switch an open/close state of an opening/closing valve mechanism, enabling detection that the outputting member reaches a predetermined position through air pressure of an air passage, whereas, the A3 invention is of a device that makes a differential pressure piston be moved by the piston 21 to switch open/close states of the two-way pilot valves 63, 64, thereby performing a reverse operation through fluid pressure of a fluid path.

<Different feature 3>

A point that, in the Patent Invention 1, it is made such that a piston is of oil pressure driven, and control fluid of a position detecting apparatus is "pressurized air", whereas, in the A3 invention, if a piston is made to be of oil pressure driven, control fluid of a reverse operation device will be "pressurized oil".

(B) Examination about the different features

a. Regarding the different feature 1

A fluid path capable of being opened and closed by the two-way pilot valves 100, 101 of the above-mentioned A3 matter is one having one end supplied with a pressure medium and the other end in communication with a collecting container, and also is one that is formed within a low pressure cylinder. Then, when an opening and closing mechanism of the Patent Invention 1 and the two-way pilot valves 100, 101 of the A3 matter are compared, "the piston 21" of A3 matter and the "outputting member" of the Patent Invention 1 correspond to each other, and, in addition to this, "the main cylinder spaces 22, 23", the "fluid pressure introducing chamber", and the "fluid introduction passage" of the A3 matter have a commonality with the "hydraulic chamber", the "oil pressure introduction chamber", and the "oil pressure introduction passage" of the Patent Invention 1 in a point that these are the "fluid chamber", the "fluid introduction chamber" and the "fluid pressure introduction passage", respectively.

When Fig. 1 in which a reverse operation device using the two-way pilot valves 63, 64 of the A3 invention is shown and Fig. 9 in which a reverse operation device using the two-way pilot valves 100, 101 is shown are compared, both pairs of pilot valves are ones that are provided in mid-course of a flow path having one end connected with a supply source of pressure p of a reverse operation device and the other end connected to a collecting container (the flow paths 61, 62 in Fig. 1 and the flow paths 93, 94 in Fig. 9), and both are ones that make a moving member (the plunger 65 of the A3 invention, and a differential pressure piston of the A3 matter) be moved by the piston 21 to switch an open/close state. Then, regarding the two-way pilot valves 63, 64 of the A3 invention and the two-way pilot valves 100, 101 of the A3 matter, a flow path in which each of these pilot valves is provided is a flow path connecting pressure p and a collecting container, and they have moving members to be made to move by the piston 21, and, therefore, it is obvious to a person skilled in the art that replacement to the two-

way pilot valves 100, 101 instead of the two-way pilot valves 63, 64 is possible.

Here, it is obvious to a person skilled in the art that, if the two-way pilot valves 100, 101 having a differential piston are provided, a spring for return action will be unnecessary, resulting in a simple structure. Then, since it is obvious that to make a structure simple is a problem to be solved also inherent in the A3 invention, it would have been easily arrived at by a person skilled in the art to adopt the two-way pilot valves 100, 101 instead of the two-way pilot valves 63, 64 adopted by the A3 invention, and, in that case, to form a fluid path within the low pressure cylinder 20, and to make a moving member moved by the piston 21 be a differential pressure piston is a constitution to be adopted as a matter of course.

As described above, it would have been easily arrived at by a person skilled in the art to make the A3 invention include the configuration concerning the aforementioned different feature 1.

b. Regarding the different feature 2

The bidirectional pilot valves 63 and 64 of the A3 invention are a part of operation switching means for switching a fluid path to make the piston 21 perform a reverse operation automatically. Then, it cannot be said that there is motivation for a person skilled in the art to try, in attempting to detect a stroke end of the piston 21 reciprocating automatically, to make the two-way pilot valves 63, 64 that are nothing but a part of operation switching means possess a function to detect a stroke end of the piston 21.

As has been described in 1.(3)A. in No 3, the Demandant alleges that it is easy to apply the "position sensor" described in A2 or "the plunger-type switch 100" described in A4. However, in the first place, the A3 invention is of an operation switching means for making the piston 21 automatically perform a reverse operation as has been indicated above, and, therefore, it cannot be recognized as there is a need to detect that the piston 21 reaches a stroke end, and accordingly it should be said that there is a lack of motivation in applying the above-mentioned constitutions described in A2 and A4.

Then, it cannot be said that it would have been easily arrived at by a person skilled in the art to make the A3 invention include the configuration concerning the aforementioned different feature 2.

c. Regarding the different feature 3

In A3, with respect to the problem points of the related art, there are the statement of the extracted matters (B) of the above-mentioned 1.(3)A. that says that "This arrangement has the disadvantage that it fails with slow movement of the work piston. The reason for this is that at very slow operation the pilot valve also opens very slowly so that the pressure loading of the control chamber is effected slowly in the end positions whereby the control valve commences to shift slowly to its opposite end position and then remains in the mid-position since the pressure difference is not sufficient to overcome the resistance to further movement.", the statement of the extracted matters (E) of the same that "Two control chambers 50, 51 of the valve 36 are connected constantly to the inlet or pressure fluid pipe 39 through auxiliary ducts or bore 52, 53.", the statement of the extracted matters (F) of the same that "the pilot valves 63, 64 are held closed in the position of rest by spring force, and in the terminal

positions they are mechanically opened by plungers 65, 66 engaged by the main or work piston 21, whereby the pressure release in the control chambers 50, 51 of the four-way valve is effected to a low pressure zone or to the collecting container 41.", and the statement of the extracted matters (G) of the same that "During the stroke of the work piston 21 towards the left, the control chamber 96 of the three-way valve 38 is released from pressure through the pipes 94, 99, 43 while the control chamber 96 of the three-way valve 37 is at pressure p through the pipes 93, 98, 42. Since two associated two-way pilot valves 100, 101 remain closed by spring force during the stroke, the pipes 98, 99 ensure that this condition is maintained since they connect the control chambers to the respective feed pipes 42, 43 running to the low pressure cylinder 20 which have the same pressure. The reversal in the left-hand end position of the work piston 21 is effected by mechanical operation of the pilot valve 100, by which operation the control chamber of the three-way valve 37 is released from pressure and the work chamber 23 receives the pressure p. At the same time, the control chamber of the three-way valve 38 is placed under pressure through the pipe 99, whereby the valve is reversed and the work chamber 22 is released from pressure.".

Then, it can be understood that the A3 invention is an invention in which, in an effort to solve the disadvantage of the related art derived from the pressure supply to the control chamber of a control valve becoming slow at a stroke end position of a work piston, an open/close state of the two-way pilot valves 63, 64, 100, 101 is switched by the piston 21 to make pressure "p" of a fluid supply source to the piston 21 be exerted to the control chambers 50, 51 of the four-way valve 36 and the control chambers of the three-way valves 37, 38, thereby achieving a quick pressure change in the control chambers by exerting pressure "p" from the pressure supply source in contrast to the case of the related art in which a pressure change is slow.

Accordingly, in the A3 invention, the technical significance exists in having a common pressure supply source for fluid for driving the piston 21 and for control fluid of a reverse operation device, and, therefore, it cannot be said that there is motivation to make these be ones different from each other such as the former being oil pressure and the latter being air, and, rather, it should be said that there is an obstructive reason to do so.

As has been described in 1.(3)A. of No. 3, the Demandant alleges that, in A1, there is described a point that an air passage for detecting a stroke end of the piston 10 is provided, and, in A4, there is described a point that an air pressure sensor can be utilized as the switch 100, and that, it is easy to apply the matters described in the above-mentioned A1 or A4 to the A3 invention. In addition, further alleged is that, from the statements of A2, A4, and A12, it is just well-known art to supply, with respect to driving fluid and control fluid of a piston, different pressurized fluids from different supply sources. However, as mentioned above, in the A3 invention, the technical significance exists in having a common pressure supply source for control fluid for reverse operation and for fluid for driving the piston 21, and, therefore, even if there is described in A1, A2, A4, and A12 that fluid for control is made to be air (it is different from fluid for driving a piston), and that a supply source for fluid for piston driving and a supply source for fluid for control are made to be separated, it cannot be said that, in the A3 invention, it is easy for a person skilled in the art to adopt air as fluid for control when oil pressure is used to drive the piston 21.

Accordingly, it cannot be said that it could have been achieved by a person skilled in the art with ease to include the configuration concerning the aforementioned different feature 3 in the A3 invention.

c. Summary as to the Patent Invention 1

As described above, it cannot be said that the Patent Invention 1 is one that could have been invented by a person skilled in the art with ease by applying the A3 invention, the matters described in the other Evidences A, and the conventionally well-known matters.

B. Regarding the Patent Inventions 2 to 7

The Patent Inventions 2 to 7 are inventions that refer to the Patent Invention 1 directly or indirectly, include all the matters specified in the Patent Invention 1, and have further limitation matters that are added. Accordingly, as with the Patent Invention 1, it cannot be said that the Patent Inventions 2 to 7 are ones that could have been invented by a person skilled in the art with ease by applying A3 invention, the matters described in the other Evidences A, and the conventionally well-known matters.

C. Closing as to the reason for invalidation 3

Accordingly, regarding the Patent Inventions 1 to 7, the reason for invalidation 3 advocated by the Demandant is groundless.

(4) Reason for invalidation 4

A. Statements of the description and the like of the Original Application before the division of the Patent

In the description of the Original Application before the division of the Patent (hereinafter, referred to as "Original Application Description")", there are statements of the extracted matters (A) to (D) of the above-mentioned 1.(4)A. of No. 3 alleged by the Demandant. In addition, in "[Patent Document 2] Japanese Unexamined Patent Application Publication No. 2003-305626" (A8) described in the extracted matters (B) in question, there are the extracted matter (A) and the illustration of (B) of the above-mentioned 1.(4)B. in No. 3.

B. Examination

From the statement of the above-mentioned A8, the closing face 68 is one that opens and closes an opening 71a or 72a by sliding relative to that opening 71a or 72a when the clamp rod 5 moves in the shaft center direction, and, it is common general technical knowledge for a person skilled in the art that, when it is used for a long period of time, closing performance against the opening 71a and 72a degrades by wear and the like originated from such sliding portions. In addition, it is obvious to a person skilled in the art that the longer the distance of such travel with sliding relative to each other, the more severe wear and the like of the sliding portions would be. Then, it is also obvious to a person skilled in the art that, the shorter a moving distance, the greater the mitigation of decline of closing performance that comes with the above-mentioned sliding, with the best case of the moving distance being zero.

Accordingly, even if there is a sliding portion remaining between a closing face

and an opening, it can be said that a person skilled in the art can understand, from the statements of the original description, that the above-mentioned problem of the related art can be solved, not by a constitution in which, as is the case with one provided with a sliding face 68 on the outer periphery surface of the detection tool 62 coupled to the clamp rod 5 described in A8, a moving distance of the clamp rod 5 in the axis direction and a moving distance of the sliding face 68 are equal, but by constituting the sliding surface such that, in response to movement of the clamp rod 5 in the axis direction, opening and closing is performed with a shorter moving distance than that of the clamp rod 5, as is the case with the Patent Invention 1, for example.

Then, even if the limitation of "a configuration in which a valve body is in contact with a valve seat" is omitted in the scope of claims of the divisional application concerning the Patent, it cannot be said that the divisional application concerning the Patent is not an application that has been made within the scope of the matters described in the Original Application Description.

C. Summary

As described above, the divisional application concerning the Patent is an application that has been done legitimately, and thus it is construed as the application concerning the Patent to be an application that has been made at the time of the application of the Original Application under the provisions of Article 44(2) of the Patent Act.

Accordingly, the allegation of the Demandant that the inventions according to the Patent Inventions 1 to 7 are described in A11 that is a public publication concerning the Original Application is unreasonable.

D. Closing as to the reason for invalidation 4

Therefore, regarding the Patent Inventions 1 to 7, the reason for invalidation 4 advocated by the Demandant does not hold.

No. 5 Closing

As mentioned above, the patents according to the Patent Inventions 1 to 7 cannot be invalidated by the allegation and the means of proof of the Demandant.

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

March, 28, 2016

Chief administrative judge: KURITA, Masahiro
Administrative judge: KUBO, Katsuhiko
Administrative judge: HIRAIWA, Shoichi