DESCRIPTION

TITLE OF INVENTION: CONDITIONING DEVICE WITH PRESSURE DETECTION

Technical Field

[0001] The present invention belongs to the technical field of manufacturing equipment for semiconductor integrated circuit chips, and particularly relates to a pad conditioner with pressure detection.

Background Art

[0002] In chemical mechanical planarization (CMP) equipment, a wafer is polished on the surface of a polishing pad. With the extension of the polishing time, the material removal rate of the polishing pad declines, so it is necessary to activate and condition the surface of the polishing pad by means of a pad conditioner provided with an activation disk, so as to recover the material removal rate of the polishing pad.

[0003] To complete conditioning of the polishing pad, during rotation of the activation disk on the pad conditioner, a pressurizing device presses against the polishing pad by means of a link and slides on the polishing pad, the downward pressure applied to the polishing pad is crucial for the conditioning effect and stability of the polishing pad, and accurate control of the downward pressure can ensure the stability of surface activation of the polishing pad while prolonging the service life of the polishing pad. However, most existing pad conditioners use initial open-loop calibration for the downward pressure. In operation, an air pressure that applies the downward pressure is controlled indirectly, and a real-time detection method is unavailable, making it impossible to accurately detect the real-time downward pressure.

[0004] Chinese Patent Publication No.CN109623662B discloses a pad conditioner with pressure detection, where a pressure sensor is arranged in an inner cavity of a conditioner body to detect the pressure when a polishing pad is conditioned by the conditioner body, and a set pressure is adjusted on the basis of the detected pressure. However, in practice, it is found that the signal

output cable of the pressure sensor rotates with a conditioning system, causing entanglement of the signal output cable, and ultimately affecting pressure detection.

SUMMARY OF INVENTION

[0005] To overcome the defects in the prior art, the present invention provides a pad conditioner with pressure detection, which separates rotation of a conditioner actuator from downward pressing of the conditioner actuator, thereby ensuring the feedback accuracy of a downward pressure.

[0006] The technical solution adopted by the present invention to solve the technical problems is as follows: a pad conditioner with pressure detection includes:

[0007] a conditioner driving unit;

[0008] a conditioner actuator, which is connected to the conditioner driving unit by means of an output shaft, driven by the conditioner driving unit to circumferentially rotate about its own axis, and driven by a conditioner base to generate an axial downward pressure;

[0009] a sensor; and

[0010] a dynamic force transmission unit, which is arranged between the sensor and the conditioner actuator, at least partially cooperates with the sensor to achieve mounting and positioning of the sensor, and is at least partially in contact with both the conditioner actuator and the sensor, so as to transmit the axial pressure of the conditioner actuator to the sensor and maintain a relatively stationary state of the sensor.

[0011] Further, the conditioner driving unit, the output shaft and the conditioner actuator are hollow to form a mounting channel, and the dynamic force transmission unit is arranged in the mounting channel.

[0012] Further, the mounting channel is located at a center of rotation of the conditioner actuator.

[0013] Further, the dynamic force transmission unit includes a fixed bracket and a force transmission structure.

[0014] Further, the sensor is wrapped in the fixed bracket, and a portion of the fixed bracket extends out of the mounting channel.

[0015] Further, the force transmission structure is at least partially in rolling contact with both the conditioner actuator and the sensor.

[0016] Further, the force transmission structure includes a first rotary support member arranged between the fixed bracket and the sensor, and a second rotary support member arranged between the sensor and the conditioner actuator.

[0017] Further, the force transmission structure includes a first rotary support member arranged between the fixed bracket and the sensor, a force transmission rod abutting against the sensor, and a second rotary support member arranged between the force transmission rod and the conditioner actuator.

[0018] Further, the force transmission structure includes a first rotary support member arranged between the fixed bracket and the sensor, a force transmission rod abutting against the conditioner actuator, and a second rotary support member arranged between the force transmission rod and the sensor.

[0019] Further, the first rotary support member is a flat thrust bearing, and the second rotary support member is a self-aligning thrust bearing.

[0020] Further, the fixed bracket is fixedly assembled to the conditioner base.

[0021] Further, the sensor is a mechanical pressure sensor.

[0022] Further, the dynamic force transmission unit includes a sealed transmission passage and a fluid pressure transmission medium located in the sealed transmission passage, one end of the sealed transmission passage is in sealing fit with the conditioner actuator and rotatably connected to the conditioner actuator, and the other end of the sealed transmission passage extends out of the mounting channel to be connected to the sensor in a sealed manner.

[0023] Further, the conditioner actuator at least includes an activation disk, a flexible layer arranged on a back side of the activation disk, and a chamber defined by the flexible layer and a

portion of the conditioner actuator, and the chamber is filled with the fluid pressure transmission medium.

[0024] Further, the sealed transmission passage includes a tube connected to the chamber in a sealed manner, and the tube extends out of the mounting channel to be connected to the sensor in a sealed manner; and the tube is a flexible tube or a rigid tube.

[0025] Further, the fluid pressure transmission medium is incompressible water; or, the fluid pressure transmission medium is a gas.

[0026] Further, the sensor is a liquid pressure sensor; or, the sensor is a gas pressure sensor.

[0027] The present invention has the following beneficial effects: (1) by means of the dynamic force transmission unit, rotation of the conditioner actuator and downward pressing of the conditioner actuator against a polishing pad are separated, thus ensuring that the sensor can accurately feed back a downward pressure, reducing friction, wear and heat generated by relative movements, and prolonging the life of a detection system; (2) the downward pressure of the conditioner actuator may be monitored in real time, and a loss of the downward pressure is avoided during the transmission process, such that detection data is valid, and the rotation of the conditioner actuator is not affected; (3) the assembly structure is relatively simple, and the mounting difficulty is lowered; (4) the sealed transmission passage cooperates with the fluid pressure transmission medium, the structural complexity is simplified by means of the fluid flexibility of the fluid pressure transmission medium, the detection sensitivity for downward pressure signals is guaranteed by means of the incompressibility of fluid, the selectivity of the mounting position of the sensor is higher, and the loss of the downward pressure during the detection process is small.

BRIEF DESCRIPTION OF DRAWINGS

[0028] FIG. 1 is a sectional view according to Embodiment 1 of the present invention.

[0029] FIG. 2 is an enlarged structural view of part A in FIG. 1.

[0030] FIG. 3 is a sectional view according to Embodiment 2 of the present invention.

[0031] FIG. 4 is an enlarged structural view of part B in FIG. 3.

[0032] FIG. 5 is a sectional view according to Embodiment 3 of the present invention.

[0033] FIG. 6 is an enlarged structural view of part C in FIG. 5.

[0034] FIG. 7 is a sectional view according to Embodiment 4 of the present invention.

[0035] FIG. 8 is a partial view of a sealed transmission passage according to Embodiment 4 of the present invention.

[0036] In the FIGS.: 1, conditioner base; 2, conditioner driving unit; 3, conditioner actuator; 31, activation disk; 32, chamber; 4, output shaft; 5, sensor; 51, signal output cable of sensor; 6, dynamic force transmission unit; 61, fixed bracket; 62, force transmission structure; 621, first rotary support member; 622, second rotary support member; 623, force transmission rod; 63, fluid pressure transmission medium; 7, mounting channel; 8, sealed transmission passage; 81, tube; 82, rotary joint; 821, rotatable portion of rotary joint; 822, stationary portion of rotary joint.

DESCRIPTION OF EMBODIMENTS

[0037] To allow those skilled in the art to have a better understanding of the technical solutions of the present invention, the technical solutions in the embodiments of the present invention will be clearly and completely described below in conjunction with the accompanying drawings of the embodiments of the present invention. Obviously, the embodiments described below are merely illustrative ones rather than all possible ones of the present invention. All other embodiments obtained by those ordinarily skilled in the art on the basis of the following ones without creative labor should also fall within the protection scope of the present invention.

Embodiment 1

[0038] A pad conditioner with pressure detection includes a conditioner driving unit 2 arranged in a conditioner base 1, a conditioner actuator 3 connected to the conditioner driving unit 2 by means of an output shaft 4, a sensor 5, and a dynamic force transmission unit 6 arranged between

the sensor 5 and the conditioner actuator 3. The conditioner actuator 3 may be driven by the conditioner driving unit 2 to circumferentially rotate about its own axis, and the conditioner actuator 3 may be driven by the conditioner base 1 to generate an axial downward pressure, which is used for conditioning a polishing pad. One end of the conditioner base 1 is connected to a link of a conditioner body, and a portion of the downward pressure of the conditioner actuator 3 is acquired by the link of the conditioner body and the conditioner base 1. This function may be achieved by an existing technique and will not be repeated here.

[0039] The dynamic force transmission unit 6 at least partially cooperates with the sensor 5 to achieve mounting and positioning of the sensor 5. Herein, "mounting and positioning" refers to that the sensor 5 is fixedly mounted at a target position. The dynamic force transmission unit 6 is at least partially in contact with both the conditioner actuator 3 and the sensor 5, so as to transmit the axial pressure of the conditioner actuator 3 to the sensor 5 and maintain a relatively stationary state of the sensor 5. Herein, the relatively stationary state of the sensor 5 refers to that the sensor 5 will not rotate with the rotation of the conditioner actuator 3.

[0040] Specifically, the conditioner driving unit 2, the output shaft 4 and the conditioner actuator 3 are sequentially arranged from top to bottom, the conditioner driving unit 2, the output shaft 4 and the conditioner actuator 3 are hollow to form a mounting channel 7, and the dynamic force transmission unit 6 is arranged in the mounting channel 7. In this embodiment, the mounting channel 7 is located at the center of rotation of the conditioner actuator 3. Of course, in other embodiments, the mounting channel 7 may deviate from the center of rotation of the conditioner actuator 3. The present invention has no specific limitation in this aspect.

[0041] As shown in FIGS. 1 and 2, the dynamic force transmission unit 6 includes a fixed bracket 61 and a force transmission structure 62. The sensor 5 is wrapped in the fixed bracket 61, a portion of the fixed bracket 61 extends out from the top of the mounting channel 7, and the portion of the fixed bracket 61 extending out of the mounting channel 7 is fixedly connected to the outside. In this embodiment, the fixed bracket 61 is fixedly assembled in and connected to the

conditioner base 1, thus ensuring that the fixed bracket 61 will not rotate along with the conditioner actuator 3. A signal output cable 51 of the sensor 5 may extend out from the fixed bracket 61. In this embodiment, the sensor 5 is arranged at a position corresponding to the output shaft 4 and the conditioner actuator 3.

[0042] The force transmission structure 62 is at least partially in rolling contact with both the conditioner actuator 3 and the sensor 5, such that the rotation of the conditioner actuator 3 will not be transmitted to the sensor 5, thereby avoiding rotation of the sensor 5. Specifically, the force transmission structure 62 includes a first rotary support member 621 arranged between the inner wall of the fixed bracket 61 and the top of the sensor 5, and a second rotary support member 622 arranged between the bottom of the sensor 5 and the conditioner actuator 3. The first rotary support member 621 is a flat thrust bearing, the second rotary support member 622 is a self-aligning thrust bearing, and the sensor 5 is a mechanical pressure sensor. Of course, in other embodiments, the first rotary support member 621 and the second rotary support member 622 may also be other structures as long as they can achieve rolling contact with the sensor 5 to achieve force transmission without driving the sensor to rotate synchronously.

[0043] In operation, a power output shaft of the conditioner driving unit 2 arranged in the conditioner base 1 is connected to the output shaft 4, the conditioner driving unit 2 drives the output shaft 4 and the conditioner actuator 3 to rotate synchronously, and the conditioner base 1 and the fixed bracket 61 of the dynamic force transmission unit 6 do not rotate; the conditioner base 1 drives the conditioner driving unit 2, the dynamic force transmission unit 6 and the conditioner actuator 3 to synchronously press against the polishing pad; in order to monitor an axial downward pressure applied to the conditioner actuator 3 by the conditioner base 1, the top surface of the rotating conditioner actuator 3 abuts against the second rotary support member 622, the second rotary support member 622 abuts against the sensor 5, and the top surface of the sensor 5 abuts against the first rotary support member 621, such that the axial pressure of the conditioner actuator 3 is transmitted to the sensor 5 without driving the sensor 5 to rotate synchronously,

thereby fulfilling the purpose of effectively monitoring the axial downward pressure, applied to the conditioner actuator 3, by the sensor 5.

Embodiment 2

[0044] As shown in FIGS. 3 and 4, this embodiment is different from Embodiment 1 in that the force transmission structure 62 includes a first rotary support member 621 arranged between the fixed bracket 61 and the sensor 5, a force transmission rod 623 abutting against the sensor 5, and a second rotary support member 622 arranged between the force transmission rod 623 and the conditioner actuator 3.

[0045] The fixed bracket 61 is fixedly assembled in and connected to the top of the conditioner base 1, and the sensor 5 is correspondingly arranged at the top of the conditioner driving unit 2.

[0046] In operation, the conditioner base 1 drives the conditioner driving unit 2, the dynamic force transmission unit 6 and the conditioner actuator 3 to synchronously press against a polishing pad; in order to monitor an axial downward pressure applied to the conditioner actuator 3 by the conditioner base 1, the top surface of the rotating conditioner actuator 3 abuts against the second rotary support member 622, the second rotary support member 622 abuts against the force transmission rod 623, the top surface of the force transmission rod 623 abuts against the bottom surface of the sensor 5, and the top surface of the sensor 5 abuts against the first rotary support member 621, such that the axial pressure of the conditioner actuator 3 is transmitted to the sensor 5 without driving the sensor 5 to rotate synchronously, thereby fulfilling the purpose of effectively monitoring the axial downward pressure, applied to the conditioner actuator 3, by the sensor 5.

[0047] The other structures in this embodiment are the same as those in Embodiment 1 and will not be repeated here.

Embodiment 3

[0048] As shown in FIGS. 5 and 6, this embodiment is different from Embodiment 1 in that the force transmission structure 62 includes a first rotary support member 621 arranged between the fixed bracket 61 and the sensor 5, a force transmission rod 623 abutting against the conditioner

actuator 3, and a second rotary support member 622 arranged between the force transmission rod 623 and the sensor 5.

[0049] The fixed bracket 61 is fixedly assembled in and connected to the top of the conditioner base 1, and the sensor 5 is correspondingly arranged at the top of the conditioner driving unit 2.

[0050] In operation, the conditioner base 1 drives the conditioner driving unit 2, the dynamic force transmission unit 6 and the conditioner actuator 3 to synchronously press against a polishing pad; in order to monitor an axial downward pressure applied to the conditioner actuator 3 by the conditioner base 1, the top surface of the rotating conditioner actuator 3 abuts against the force transmission rod 623, the top surface of the force transmission rod 623 abuts against the second rotary support member 622, and the second rotary support member 622 abuts against the bottom surface of the sensor 5, such that even if the force transmission rod 623 is driven by the conditioner actuator 3 to rotate synchronously, rotation of the sensor 5 will not be caused; and the top surface of the sensor 5 abuts against the first rotary support member 621, the first rotary support member 621 abuts against the fixed bracket 61, such that the axial pressure of the conditioner actuator 3 is transmitted to the sensor 5 without driving the sensor 5 to rotate synchronously, thereby fulfilling the purpose of effectively monitoring the axial downward pressure, applied to the conditioner actuator 3, by the sensor 5.

[0051] The other structures in this embodiment are the same as those in Embodiment 1 and will not be repeated here.

Embodiment 4

[0052] As shown in FIG. 7, in this embodiment, the dynamic force transmission unit 6 includes a sealed transmission passage 8 and a fluid pressure transmission medium 63 located in the sealed transmission passage 8, where one end of the sealed transmission passage 8 is in sealing fit with the conditioner actuator 3 and rotatably connected to the conditioner actuator 3, which specifically refers to that when the conditioner actuator 3 rotates, at least a portion of the sealed transmission passage 8 will not rotate along with the conditioner actuator 3; and the other end of the sealed

transmission passage 8 extends out of the mounting channel 7 to be connected to the sensor 5 in a sealed manner.

[0053] In operation, the conditioner base 1 drives the conditioner driving unit 2, the dynamic force transmission unit 6 and the conditioner actuator 3 to synchronously press against a polishing pad; and in order to monitor an axial downward pressure applied to the conditioner actuator 3 by the conditioner base 1, the downward pressure applied to the conditioner actuator 3 is sensed and transmitted by deformation of the fluid pressure transmission medium 63 in the sealed transmission passage 8. Furthermore, a rotary joint 82 is connected in series between the conditioner actuator 3 and the dynamic force transmission unit 6, and the rotation of the conditioner actuator 3 will not be transmitted via the sealed transmission passage 8, that is, the sensor 5 will not rotate synchronously, such that the purpose of effectively monitoring the axial downward pressure, applied to the conditioner actuator 3, by the sensor 5 is fulfilled.

[0054] To ensure that the axial downward pressure applied to the conditioner actuator 3 is accurately and sensitively sensed, a flexible layer may be arranged on the back side of an activation disk 31 of the conditioner actuator 3, the flexible layer is prone to deformation, a chamber 32 is defined by the flexible layer and a portion of the conditioner actuator 3, and the chamber 32 is filled with the fluid pressure transmission medium 63. In this embodiment, the sealed transmission passage 8 includes a tube 81 connected to the chamber 32 in a sealed manner, and the tube 81 extends out of the mounting channel 7 to be connected to the sensor 5 in a sealed manner. The tube 81 may be a flexible tube or a rigid tube, and the present invention has no specific limitation in this aspect. A fully sealed space may be formed between the chamber 32, the tube 81 and the sensor 5 on the basis of an existing technique, and details will not be given here.

[0055] As shown in FIG. 8, in one embodiment, the rotary joint 82 is used for isolating the rotational motion of the conditioner actuator 3. The sealing scheme for the rotary joint 82 mainly involves two aspects: static seal between a lower portion of the rotary joint 82 and the conditioner actuator 3, as well as static seal between an upper portion of the rotary joint 82 and the tube 81,

and dynamic seal in the rotary joint 82.

[0056] The rotary joint 82 includes a rotatable portion 821 and a stationary portion 822, where an inner wall of the rotatable portion 821 is in sealing fit with the stationary portion 822 by means of a dynamic sealing element, an outer wall of the rotatable portion 821 is in sealing fit with the conditioner actuator 3 by means of a static sealing element. An inner wall of the stationary portion 822 is in sealing fit with the tube 81 by means of a static sealing element. Because the sealing elements are relatively static, the static sealing elements are preferably O-shaped sealing rings with a relatively large compression ratio. The dynamic sealing element may be selected according to the actual fluid pressure. Since the pressure here is relatively low and the rotational speed is also relatively low, the dynamic sealing ring is also preferably an O-shaped sealing ring. For detection requiring a high rotational speed or a high pressure, the dynamic sealing element may be preferably, but not limited to, a V-shaped sealing ring, a Glyd ring, a rigid seal, etc.

[0057] When the conditioner actuator 3 applies a specific downward pressure to a polishing pad, the pressure of the fluid pressure transmission medium 63 in the sealed transmission passage 8 rises due to flexible deformation of the upper portion of the conditioner actuator 3, and the pressure change is sensed and acquired by the sensor 5. The conditioner actuator 3 has two functions: (1) the thin flexible layer on the upper portion of the conditioner actuator 3 provides a deformation space for a change of the volume of the sealed transmission passage 8; (2) the upper portion of the conditioner actuator 3 also transmits the torque of the output shaft 4 downward to the activation disk 31.

[0058] During the movement process, the presence of the fluid pressure transmission medium 63 in the sealed transmission passage 8 will not limit the degree of freedom of the activation disk 31. When the downward pressure is applied to the conditioner actuator 3, a specific pressure will be applied to the fluid pressure transmission medium 63 in the sealed transmission passage 8 due to the flexibility of the flexible layer; and due to the incompressibility of the fluid pressure transmission medium 63, the liquid or gas pressure is transmitted to the sensor 5 instantly by means

of the dynamic force transmission unit 6, thereby achieving acquisition of a downward pressure signal.

[0059] The fluid pressure transmission medium 63 may be incompressible water, and in this case, the sensor 5 is a liquid pressure sensor, and the tube 81 is a hydraulic tube. The fluid pressure transmission medium 63 may also be a gas, and in this case, the sensor 5 is a gas pressure sensor, and the tube 81 is preferably a flexible gas tube with a small diameter to reduce the pressure loss during the detection process, so as to ensure the accuracy of the detected pressure.

[0060] The above specific embodiments are used for explaining the present invention rather than limiting the present invention. Any modifications and transformations made to the present invention on the basis of the spirit of the present invention and the protection scope of the claims should fall within the protection scope of the present invention.

CLAIMS

[Claim 1] A pad conditioner with pressure detection, characterized by comprising:

a conditioner driving unit (2);

a conditioner actuator (3), which is connected to the conditioner driving unit (2) by means of an output shaft (4), driven by the conditioner driving unit (2) to circumferentially rotate about its own axis, and driven by a conditioner base (1) to generate an axial downward pressure;

a sensor (5); and

a dynamic force transmission unit (6), which is arranged between the sensor (5) and the conditioner actuator (3), at least partially cooperates with the sensor (5) to achieve mounting and positioning of the sensor (5), and is at least partially in contact with both the conditioner actuator (3) and the sensor (5), so as to transmit the axial pressure of the conditioner actuator (3) to the sensor (5) and maintain a relatively stationary state of the sensor (5).

[Claim 2] The pad conditioner with pressure detection according to claim 1, characterized in that the conditioner driving unit (2), the output shaft (4) and the conditioner actuator (3) are hollow to form a mounting channel (7), and the dynamic force transmission unit (6) is arranged in the mounting channel (7).

[Claim 3] The pad conditioner with pressure detection according to claim 2, characterized in that the mounting channel (7) is located at a center of rotation of the conditioner actuator (3).

[Claim 4] The pad conditioner with pressure detection according to claim 1 or 2, characterized in that the dynamic force transmission unit (6) comprises a fixed bracket (61) and a force transmission structure (62).

[Claim 5] The pad conditioner with pressure detection according to claim 4, characterized in that the sensor (5) is wrapped in the fixed bracket (61), and a portion of the fixed bracket

(61) extends out of the mounting channel (7).

[Claim 6] The pad conditioner with pressure detection according to claim 4, characterized in that the force transmission structure (62) is at least partially in rolling contact with both the conditioner actuator (3) and the sensor (5).

[Claim 7] The pad conditioner with pressure detection according to claim 6, characterized in that the force transmission structure (62) comprises a first rotary support member (621) arranged between the fixed bracket (61) and the sensor (5), and a second rotary support member (622) arranged between the sensor (5) and the conditioner actuator (3).

[Claim 8] The pad conditioner with pressure detection according to claim 6, characterized in that the force transmission structure (62) comprises a first rotary support member (621) arranged between the fixed bracket (61) and the sensor (5), a force transmission rod (623) abutting against the sensor (5), and a second rotary support member (622) arranged between the force transmission rod (623) and the conditioner actuator (3).

[Claim 9] The pad conditioner with pressure detection according to claim 6, characterized in that the force transmission structure (62) comprises a first rotary support member (621) arranged between the fixed bracket (61) and the sensor (5), a force transmission rod (623) abutting against the conditioner actuator (3), and a second rotary support member (622) arranged between the force transmission rod (623) and the sensor (5).

[Claim 10] The pad conditioner with pressure detection according to claim 7, 8 or 9, characterized in that the first rotary support member (621) is a flat thrust bearing, and the second rotary support member (622) is a self-aligning thrust bearing.

[Claim 11] The pad conditioner with pressure detection according to claim 4, characterized in that the fixed bracket (61) is fixedly assembled to the conditioner base (1).

[Claim 12] The pad conditioner with pressure detection according to claim 4, characterized in that the sensor (5) is a mechanical pressure sensor.

[Claim 13] The pad conditioner with pressure detection according to claim 1 or 2, characterized

in that the dynamic force transmission unit (6) comprises a sealed transmission passage (8) and a fluid pressure transmission medium (63) located in the sealed transmission passage (8), one end of the sealed transmission passage (8) is in sealing fit with the conditioner actuator (3) and rotatably connected to the conditioner actuator (3), and the other end of the sealed transmission passage (8) extends out of the mounting channel (7) to be connected to the sensor (5) in a sealed manner.

[Claim 14] The pad conditioner with pressure detection according to claim 13, characterized in that the conditioner actuator (3) at least comprises an activation disk (31), a flexible layer arranged on a back side of the activation disk (31), and a chamber (32) defined by the flexible layer and a portion of the conditioner actuator (3), and the chamber (32) is filled with the fluid pressure transmission medium (63).

[Claim 15] The pad conditioner with pressure detection according to claim 14, characterized in that the sealed transmission passage (8) comprises a tube (81) connected to the chamber (32) in a sealed manner, and the tube (81) extends out of the mounting channel (7) to be connected to the sensor (5) in a sealed manner; and the tube (81) is a flexible tube or a rigid tube.

[Claim 16] The pad conditioner with pressure detection according to claim 13, characterized in that the fluid pressure transmission medium (63) is incompressible water; or, the fluid pressure transmission medium (63) is a gas.

[Claim 17] The pad conditioner with pressure detection according to claim 13, characterized in that the sensor (5) is a liquid pressure sensor; or, the sensor (5) is a gas pressure sensor.