

POLISHING HEAD AND WAFER POLISHING DEVICE HAVING THE SAME

TECHNICAL FIELD

The present disclosure relates to the technical field of chemical mechanical polishing, in particular to a polishing head and a wafer polishing device having the same.

BACKGROUND

In the chip manufacturing process, chemical mechanical polishing (CMP) process is used as an important planarization technology in the polishing process of wafers. However, with the increase in the diameter of the wafer and the gradual reduction in the size of the key features of chips, the requirements for high flatness, uniformity, and consistency of the wafer surface become more and more stringent. At present, wafer grinding technologies usually involve pressuring filling of a soft membrane chamber in the polishing head, where the dimension of the soft membrane chamber is similar to that of the wafer. Through pressure filling, a downward pressure is generated inside the soft membrane chamber to grind and polish the wafer on the polishing pad.

In existing technologies, polishing heads mostly adopt a structure of one membrane with multiple gas chambers, where a soft membrane has an inner cavity that is divided into multiple pressure-adjustable chambers by multiple inner annular retaining membranes distributed on its bottom plate. During the grinding process, the soft membrane is in direct contact with the wafer through the bottom plate, and the multiple chambers act on different annular areas of the wafer through the bottom plate to cooperate with the pressed polishing operation.

During the grinding process, due to the movement of the soft membrane and the different pressures in the gas chambers on the soft membrane, it is likely to cause deformation or displacement of the inner annular retaining membranes on the soft membrane relative to the bottom plate. As the inner annular retaining membranes on the soft membrane are connected to the bottom plate, it may lead to deformation of the bottom plate, which in turn leads to unstable pressure on the wafer by the bottom plate, thereby affecting the grinding effect of the wafer. Factors such as the reaction force and frictional force by the wafer may lead to further deformation or displacement of the inner annular retaining membranes relative to the bottom plate, further affecting effectiveness of wafer planarization.

SUMMARY

Therefore, the technical problem to be solved by the present disclosure is to overcome the problem of wafer planarization being affected by the deformation or displacement of the inner annular retaining membranes on the soft membrane relative to the bottom plate during the polishing process of the polishing head in the prior art.

In a first aspect, embodiments of the present disclosure provide a polishing head, which comprises:

a main body; and

an elastic membrane assembly on the main body, wherein the elastic membrane assembly comprises an inner membrane and an outer membrane that are nested; the inner membrane is fixed to a bottom wall of the main body; the inner membrane is formed with a plurality of mutually independent pressure chambers for acting on a central area of a wafer; the outer membrane is fitted around outer peripheral side of the main body; the outer membrane covers the inner membrane, and a buffer gap is provided between the outer membrane and the inner membrane;

wherein during a grinding process, the inner membrane exerts force on the wafer through the outer membrane.

Optionally, an edge chamber for acting on an edge area of the wafer is formed between outer peripheral wall of the inner membrane and inner peripheral wall of the outer membrane.

Optionally, the edge chamber comprises a first chamber and a second chamber from top to bottom and independent of each other; wherein,

the first chamber exerts a force on the second chamber when internal gas pressure increases, and the force is transmitted to the edge area of the wafer through deformation of the second chamber.

Optionally, the outer membrane comprises a first bottom plate; a peripheral side wall extending upward from outer periphery of the first bottom plate in the vertical direction; and a first horizontal extension rib extending inwardly from top edge of the peripheral side wall;

the edge chamber is formed and enclosed by the first horizontal extension rib, inner side of the peripheral side wall, the first bottom plate, the outer peripheral wall of the inner membrane, and outer wall of the main body;

a second horizontal extension rib is fixed to the inner side of the peripheral side wall of the outer membrane; the second horizontal extension rib is located between the first

horizontal extension rib and the first bottom plate; and the second horizontal extension rib divides the edge chamber into the first chamber and the second chamber;

the second horizontal extension rib and the first horizontal extension rib are each annular, and outer periphery of the main body is provided with a clamping protrusion for connecting with the outer membrane; an inner circumferential edge of the second horizontal extension rib and an inner circumferential edge of the first horizontal extension rib form an annular clamping interface for clamping on the clamping protrusion.

Optionally, the polishing head further comprises:

an outer ring, being annular shaped and located in the second chamber; wherein top wall of the outer ring is in contact with the second horizontal extension rib, and bottom wall is in contact with inner wall of the first bottom plate, for transmitting the force from the first chamber to the first bottom plate, and transmitting the force to the edge area of the wafer through the first bottom plate;

wherein outer side wall of the outer ring is in contact with inner side wall of the outer membrane, for limiting radial deformation of the outer membrane.

Optionally, the polishing head further comprises:

an inner ring, being annular shaped and on outer side wall of the inner membrane; wherein the inner ring wraps around outer periphery of the inner membrane, for limiting radial deformation of the inner membrane.

Optionally, the main body comprises a bearing disk, and the clamping protrusion is formed by an outward projection from an upper part of peripheral wall of the bearing disk; and an anti-detachment hook is provided at a bottom corner of the clamping protrusion;

an annular limiting step is formed by top wall of the anti-detachment hook and outer peripheral wall of the clamping protrusion; an inner edge of the first horizontal extension rib is clamped and confined to the limiting step; an annular limiting groove is formed by inner peripheral wall of the anti-detachment hook, bottom wall of the clamping protrusion, and outer peripheral wall of the bearing disk; and an inner edge of the second horizontal extension rib is hooked by and confined to the limiting groove;

the inner ring has a deformation limiting part around the outer periphery of the inner membrane and a snap-in positioning part extending upward from edge of the deformation limiting part; the snap-in positioning part is snapped in and squeezed within a matching gap between the inner edge of the second horizontal extension rib and the limiting groove.

Optionally, the inner membrane includes a second bottom plate, and a plurality of annular pressure chambers formed on the second bottom plate at intervals from inside to outside;

the second bottom plate is opposite to bottom wall of the outer membrane, with a reserved preset buffer gap therebetween.

Optionally, each pressure chamber is formed and enclosed by two opposite annular retaining ribs and the second bottom plate, and an annular opening for connection with the main body is formed between upper edges of the two annular retaining ribs;

the inner membrane is detachably connected to bottom of the main body through a pressing ring; the pressing ring has an annular pressing portion and a connecting protrusion fixed to top of the annular pressing portion; the annular pressing portion presses against inner side of top walls of the two annular retaining ribs; and the connecting protrusion protrudes from the annular opening to connect with the main body;

a sealing lip is provided along edge of the annular retaining rib of the inner membrane; and the pressing ring presses the sealing lip against bottom wall of the main body.

In a second aspect, embodiments of the present disclosure provide a wafer polishing device, which comprises the polishing head described in any one of the preceding embodiments.

The technical solutions of the present disclosure have the following benefits:

1. In some embodiments of the present disclosure, an elastic membrane assembly is provided, which includes an inner membrane and an outer membrane that are nested. Compare to the structure of one membrane with multiple gas chambers in the prior art, the inner membrane in the embodiments of the present disclosure exerts force on the outer membrane, and exerts force on the wafer through the outer membrane; and a buffer gap is provided between the outer membrane and the inner membrane, which avoids significant impact on each other during individual deformation of the inner or outer membrane. During the grinding process of the wafer using the polishing head, since the reaction force and frictional force on the polishing head by the wafer are directly exerted on the outer membrane rather than the inner membrane, the radial deformation or displacement of the outer membrane relative to the main body would not directly cause deformation or displacement of the inner membrane. Therefore, it can reduce the degree of displacement or deformation of the inner membrane during the grinding process, thereby improving the flatness of the grinding surface and effectiveness of the process.

Further, a buffer gap is provided between the outer membrane and the inner membrane, which has a buffering effect. Even if there is any pressure dispersing or inner membrane deformation during the expansion process of pressure chambers in the inner membrane due to pressure differences between the pressure chambers, with the buffering effect, the unevenness of the pressure on the central area of the wafer caused by inner membrane deformation can be reduced, thereby reducing the impact of inner membrane deformation on the wafer and improving the flatness of the wafer.

2. Some embodiments of the present disclosure provide an edge chamber, and by adjusting the pressing force on the wafer by the edge chamber, the amount of grinding in the edge area of the wafer can be adjusted.

3. Due to the lack of constraints around the elastic membrane in the prior art, the gas chamber expands in the horizontal direction during the expansion process, causing the vertical pressure on the wafer by the gas chamber to be dispersed, affecting the control of the pressure on the wafer by the gas chamber. An outer ring is provided in the embodiments of the present disclosure. On the one hand, the outer ring can transmit the force from the first chamber to the first bottom plate, and transmit the force to the edge area of the wafer through the first bottom plate; on the other hand, the outer ring can limit radial deformation of the outer membrane so that the second chamber deforms longitudinally. The longitudinal deformation generates uniform downward pressure, avoiding dispersing of the vertical pressure and improving the control of the pressure on the wafer by the gas chamber.

4. In some embodiments of the present disclosure, since an annular rib is provided on the first supporting wall of the outer ring, when the second chamber is deformed during the grinding process, contact between the outer peripheral wall of the inner membrane and the inner peripheral wall of the outer membrane may be avoided.

5. Some embodiments of the present disclosure provide an inner ring. On the one hand, the inner ring may effectively constrain the expansion of the inner membrane in the horizontal direction, so that the pressure of the inner membrane concentrates to act in the vertical direction, in order to control the pressure exerted by the inner membrane on the wafer more effectively. On the other hand, the inner ring may prevent pressure control on the wafer at the edge of the outer membrane from being affected by the horizontal expansion of the inner membrane.

BRIEF DESCRIPTION OF DRAWINGS

In order to more clearly illustrate embodiments of the present disclosure or the technical solutions in the prior art, the following will briefly describe the drawings used in the description of the embodiments or the prior art. Clearly, the drawings of the following descriptions are some embodiments of the present disclosure. Those of ordinary skill in the art may obtain other drawings based on these drawings without creative effort.

Fig. 1 is a schematic structural diagram of a polishing head of the present disclosure;

Fig. 2 is a schematic diagram of the longitudinal section of an elastic membrane assembly.

Fig. 3 is a schematic diagram of the longitudinal section of an outer ring and an inner ring.

Reference numerals:

- 1. main body;
- 2. inner membrane; 21. second bottom plate; 22. annular retaining rib; 23. sealing lip;
- 3. outer membrane; 31. first bottom plate; 32. first horizontal extension rib; 33. second horizontal extension rib;
- 4. first chamber; 5. second chamber.
- 6. outer ring; 7. inner ring; 8. pressing ring.

DETAILED DESCRIPTION

The technical solutions of the present disclosure will be more clearly and completely described below with reference to the drawings. Clearly, the described embodiments are only some of the embodiments of the present disclosure, not all of the embodiments. Based on the embodiments in the present disclosure, all other embodiments obtainable by those of ordinary skill in the art without creative efforts shall fall within the protection scope of the present disclosure.

In the description of the present disclosure, it should be noted that orientation or positional relationship indicated by the terms "centre", "upper", "lower", "left", "right", "vertical", "horizontal", "inner", "outer", etc. is based on the orientation or positional relationship as shown in the drawings, only for the convenience of describing and simplifying the description, and does not indicate or imply that the referred apparatus or element must have a specific orientation, or constructed or operated in a specific orientation. Thus, it should not be construed as a limitation of the present disclosure. Further, the terms

"first", "second", "third" are only used for descriptive purposes only and cannot be construed as indicating or implying relative importance.

In the description of the present disclosure, it should be noted that, unless otherwise expressly specified and limited, the terms "install", "connect" and "connection" should be construed in a broad sense. For example, it may be a fixed connection or a detachable connection, or integral connection. It may be mechanical connection or electrical connection. It may be direct connection, or indirect connection through an intermediate medium, or internal communication between two components. For those of ordinary skill in the art, the specific meanings of the above terms in the present disclosure can be understood in specific situations.

In addition, the technical features involved in the different embodiments of the present disclosure described below can be combined with each other as long as they do not conflict with each other.

Embodiment

As shown in Fig. 1 to Fig. 3, an embodiment of the present disclosure provides a polishing head, including a main body 1 and an elastic membrane assembly on the main body 1, where the elastic membrane assembly includes an inner membrane 2 and an outer membrane 3 that are nested. The inner membrane 2 is fixed to a bottom wall of the main body 1; the inner membrane 2 is formed with a plurality of mutually independent pressure chambers for acting on a central area of a wafer; the outer membrane 3 is fitted around outer peripheral side of the main body 1; the outer membrane 3 covers the inner membrane 2, and a buffer gap is provided between the outer membrane 3 and the inner membrane 2. During the grinding process, the inner membrane 2 exerts force on the wafer through the outer membrane 3.

The embodiment of the present disclosure provides the elastic membrane assembly formed by two soft membranes, the inner membrane 2 and the outer membrane 3, that are nested. Compare to the structure of one membrane with multiple gas chambers in the prior art, the inner membrane 2 in the embodiment of the present disclosure exerts force on the outer membrane 3, and exerts force on the wafer through the outer membrane 3; and a buffer gap is provided between the outer membrane 2 and the inner membrane 3, which avoids significant impact on each other when the inner membrane or outer membrane deforms. During the grinding process of the wafer using the polishing head, since the reaction force and frictional force on the polishing head by the wafer are directly exerted on the outer

membrane 3 rather than the inner membrane 2, the radial deformation or displacement of the outer membrane 3 relative to the main body 1 would not directly cause deformation or displacement of the inner membrane 2. Therefore, it can reduce the degree of displacement or deformation of the inner membrane 2 during the grinding process, thereby improving the flatness of the grinding surface and effectiveness of the process.

Further, the buffer gap is provided between the outer membrane 3 and the inner membrane 2, which has a buffering effect. Even if there is any pressure dispersing or inner membrane deformation during the expansion process of pressure chambers in the inner membrane 2 due to pressure differences between the pressure chambers, with the buffering effect, the unevenness of the pressure on the central area of the wafer caused by the deformation of the inner membrane 2 can be reduced, thereby reducing the impact of inner membrane deformation on the wafer and improving the flatness of the wafer.

Optionally, an edge chamber for acting on an edge area of the wafer is formed between the outer peripheral wall of the inner membrane 2 and the inner peripheral wall of the outer membrane 3. The embodiment provides the edge chamber, and by adjusting the pressing force on the wafer by the edge chamber, the amount of grinding in the edge area of the wafer can be adjusted.

Optionally, the edge chamber includes a first chamber 4 and a second chamber 5 from top to bottom and independent of each other. The first chamber 4 exerts a force on the second chamber 5 when internal gas pressure increases, and the force is transmitted to the edge area of the wafer through deformation of the second chamber 5.

Optionally, the outer membrane 3 includes a first bottom plate 31; a peripheral side wall extending upward from outer periphery of the first bottom plate 31 in the vertical direction; and a first horizontal extension rib 32 extending inwardly from top edge of the peripheral side wall; the edge chamber is formed and enclosed by the first horizontal extension rib 32, the inner side of the peripheral side wall, the first bottom plate 31, the outer peripheral wall of the inner membrane 2 and the outer wall of the main body 1; a second horizontal extension rib 33 is fixed to the inner side of the peripheral side wall of the outer membrane 3; the second horizontal extension rib 33 is located between the first horizontal extension rib 32 and the first bottom plate 31; and the second horizontal extension rib 33 divides the edge chamber into the first chamber 4 and the second chamber 5; the second horizontal extension rib 33 and the first horizontal extension rib 32 are each annular, and the outer periphery of the main body 1 is provided with a clamping protrusion for connecting

with the outer membrane 3; an inner circumferential edge of the second horizontal extension rib 33 and an inner circumferential edge of the first horizontal extension rib 32 form an annular clamping interface for clamping on the clamping protrusion.

Optionally, the polishing head further includes an outer ring 6, being annular shaped and located in the second chamber 5; wherein the top wall of the outer ring 6 is in contact with the second horizontal extension rib 33, and the bottom wall is in contact with the inner wall of the first bottom plate 31, for transmitting the force from the first chamber 4 to the first bottom plate 31, and transmitting the force to the edge area of the wafer through the first bottom plate 31. Optionally, the outer side wall of the outer ring 6 is in contact with the inner side wall of the outer membrane 3, for limiting radial deformation of the outer membrane 3, to cause the second chamber 5 to deform longitudinally. The longitudinal deformation results in uniform downward pressure.

Due to the lack of constraints around the elastic membrane in the prior art, the gas chamber expands in the horizontal direction during the expansion process, causing the vertical pressure on the wafer by the gas chamber to be dispersed, affecting the control of the pressure on the wafer by the gas chamber. An outer ring 6 is provided in the embodiment. On the one hand, the outer ring 6 can transmit the force from the first chamber 4 to the first bottom plate 31, and transmit the force to the edge area of the wafer through the first bottom plate 31; on the other hand, the outer ring 6 can limit radial deformation of the outer membrane 3 so that the second chamber 5 deforms longitudinally. The longitudinal deformation generates uniform downward pressure, avoiding the dispersing of the vertical pressure and improving the control of the pressure on the wafer by the gas chamber.

Optionally, the cross section of the outer ring 6 is "┐"-shaped. The outer ring 6 has a first supporting wall against the inner peripheral wall of the outer membrane 3, and a second supporting wall that extends inward from the upper periphery of the first supporting wall; the second supporting wall abuts the second horizontal extension rib 33 from below. Optionally, the second supporting wall of the outer ring 6 is shaped into a plane. The provision of the plane increases the contact area between the outer ring 6 and the second horizontal extension rib 33. The downward force generated by the longitudinal deformation of the first chamber 4 is transmitted to the edge area of the wafer via the outer ring 6.

Optionally, an annular rib is formed on inner side of the first supporting wall. In the embodiment, since the annular rib is provided on the first supporting wall of the outer ring 6, when the second chamber 5 is deformed during the grinding process, complete contact

between the outer peripheral wall of the inner membrane 2 and the inner peripheral wall of the outer membrane 3 can be avoided. Optionally, the annular rib has a triangular longitudinal section.

Optionally, the polishing head further includes an inner ring 7, being annular shaped and on the outer side wall of the inner membrane 2; where the inner ring 7 wraps around outer periphery of the inner membrane 2, for limiting radial deformation of the inner membrane 2. By providing the inner ring in the embodiment, the following benefits are achieved: on the one hand, the inner ring 7 can effectively constrain the expansion of the inner membrane 2 in the horizontal direction, so that the pressure of the inner membrane 2 concentrates to act in the vertical direction, in order to control the pressure exerted by the inner membrane 2 on the wafer more effectively; on the other hand, the inner ring 7 may prevent pressure control on the wafer at the edge of the outer membrane 3 from being affected by the horizontal expansion of the inner membrane 2.

Optionally, the main body 1 includes a bearing disk, and the clamping protrusion is formed by an outward projection from an upper part of peripheral wall of the bearing disk; and an anti-detachment hook is provided at a bottom corner of the clamping protrusion.

An annular limiting step is formed by top wall of the anti-detachment hook and outer peripheral wall of the clamping protrusion; an inner edge of the first horizontal extension rib 32 is clamped and confined to the limiting step; an annular limiting groove is formed by inner peripheral wall of the anti-detachment hook, bottom wall of the clamping protrusion, and outer peripheral wall of the bearing disk; and an inner edge of the second horizontal extension rib 33 is hooked by and confined to the limiting groove.

The inner ring 7 has a deformation limiting part around the outer periphery of the inner membrane 2 and a snap-in positioning part extending upward from edge of the deformation limiting part; the snap-in positioning part is snapped in and squeezed within a matching gap between the inner edge of the second horizontal extension rib 33 and the limiting groove.

Optionally, the deformation limiting part of the inner ring has a L-shaped longitudinal section. The snap-in positioning part is step-shaped or Z-shaped, and has a positioning effect on the inner membrane 2. With the snap-in positioning part, the stability of the structure among the inner membrane 2, the outer membrane 3 and the main body 1 can be improved. The inner ring 7 has multiple uses, simplifying the structure and eliminating the need for additional structures such as positioning rings.

The inner membrane 2 includes a second bottom plate 21, and a plurality of annular pressure chambers formed on the second bottom plate 21 at intervals from inside to outside; the second bottom plate 21 is opposite to the bottom wall of the outer membrane 3, with a preset buffer gap therebetween. In the embodiment of the present disclosure, the second bottom plate 21 is arranged opposite to the first bottom plate 31, and the two may undergo relative deformation or displacement during the grinding process. The force exerted on the elastic membrane assembly by the wafer is not directly exerted on the inner membrane 2, thereby reducing the degree of deformation or displacement of inner membrane 2. Further, because the second bottom plate 21 of the inner membrane 2 and the first bottom plate 31 of the outer membrane 3 are relatively close to each other, thus avoiding as much as possible reduction of pressure control of the inner membrane 2 on the wafer.

Optionally, each pressure chamber is formed and enclosed by two opposite annular retaining ribs 22 and the second bottom plate 21, and an annular opening for connection with the main body 1 is formed between upper edges of the two annular retaining ribs 22. In the embodiment, when the pressure chamber expands, the annular retaining ribs 22 deform relative to the second bottom plate 21. Since the annular retaining ribs 22 on the inner membrane 2 are not connected to the outer membrane 3, the deformation of the annular retaining ribs 22 does not directly cause the deformation or displacement of the outer membrane 3.

The inner membrane 2 is detachably connected to the bottom of the main body 1 through a pressing ring 8; the pressing ring 8 has an annular pressing portion and a connecting protrusion fixed to the top of the annular pressing portion; the annular pressing portion presses against inner side of the top walls of the two annular retaining ribs 22; and the connecting protrusion protrudes from the annular opening to connect with the main body 1; a sealing lip 23 is provided along the edge of the annular retaining rib 22 of the inner membrane 2; and the pressing ring 8 presses the sealing lip 23 against bottom wall of the main body 1.

The embodiments of the present disclosure further provide a wafer polishing device, which comprises the polishing head described in any one of the preceding embodiments. The wafer polishing device provided by the present disclosure comprises the aforementioned polishing head. The technical advantages and effects achieved by the wafer polishing device also include the technical advantages and effects achieved by the polishing head, which will not be described again here.

Clearly, the above embodiments are only examples for clear description, and are not intended to limit the manner of implementation. For those of ordinary skill in the art, there are other variations or changes that can be made in different forms based on the above description. It is not necessary or possible to exhaust all embodiments here. The obvious variations or changes derived therefrom are still within the protection scope of the present disclosure.

CLAIMS

1. A polishing head, comprising:

a main body (1); and

an elastic membrane assembly on the main body (1), wherein the elastic membrane assembly comprises an inner membrane (2) and an outer membrane (3) that are nested; the inner membrane (2) is fixed to a bottom wall of the main body (1); the inner membrane (2) is formed with a plurality of mutually independent pressure chambers for acting on a central area of a wafer; the outer membrane (3) is fitted around outer peripheral side of the main body (1); the outer membrane (3) covers the inner membrane (2), and a buffer gap is provided between the outer membrane (3) and the inner membrane (2);

wherein during a grinding process, the inner membrane (2) exerts force on the wafer through the outer membrane (3).

2. The polishing head according to claim 1, wherein an edge chamber for acting on an edge area of the wafer is formed between outer peripheral wall of the inner membrane (2) and inner peripheral wall of the outer membrane (3).

3. The polishing head according to claim 2, wherein the edge chamber comprises a first chamber (4) and a second chamber (5) from top to bottom and independent of each other; wherein,

the first chamber (4) exerts a force on the second chamber (5) when internal gas pressure increases, and the force is transmitted to the edge area of the wafer through deformation of the second chamber (5).

4. The polishing head according to claim 3, wherein the outer membrane (3) comprises a first bottom plate (31); a peripheral side wall extending upward from outer periphery of the first bottom plate (31) in the vertical direction; and a first horizontal extension rib (32) extending inwardly from top edge of the peripheral side wall;

the edge chamber is formed and enclosed by the first horizontal extension rib (32), inner side of the peripheral side wall, the first bottom plate (31), the outer peripheral wall of the inner membrane (2), and outer wall of the main body (1);

a second horizontal extension rib (33) is fixed to the inner side of the peripheral side wall of the outer membrane (3); the second horizontal extension rib (33) is located between the first horizontal extension rib (32) and the first bottom plate (31); and the second

horizontal extension rib (33) divides the edge chamber into the first chamber (4) and the second chamber (5);

the second horizontal extension rib (33) and the first horizontal extension rib (32) are each annular, and outer periphery of the main body (1) is provided with a clamping protrusion for connecting with the outer membrane (3); an inner circumferential edge of the second horizontal extension rib (33) and an inner circumferential edge of the first horizontal extension rib (32) form an annular clamping interface for clamping on the clamping protrusion.

5. The polishing head according to claim 4, further comprising:

an outer ring (6), being annular shaped and located in the second chamber (5); wherein top wall of the outer ring (6) is in contact with the second horizontal extension rib (33), and bottom wall is in contact with inner wall of the first bottom plate (31), for transmitting the force from the first chamber (4) to the first bottom plate (31), and transmitting the force to the edge area of the wafer through the first bottom plate (31);

wherein outer side wall of the outer ring (6) is in contact with inner side wall of the outer membrane (3), for limiting radial deformation of the outer membrane (3).

6. The polishing head according to claim 4, further comprising:

an inner ring (7), being annular shaped and on outer side wall of the inner membrane (2); wherein the inner ring (7) wraps around outer periphery of the inner membrane (2), for limiting radial deformation of the inner membrane (2).

7. The polishing head according to claim 6, wherein the main body (1) comprises a bearing disk, and the clamping protrusion is formed by an outward projection from an upper part of peripheral wall of the bearing disk; and an anti-detachment hook is provided at a bottom corner of the clamping protrusion;

an annular limiting step is formed by top wall of the anti-detachment hook and outer peripheral wall of the clamping protrusion; an inner edge of the first horizontal extension rib (32) is clamped and confined to the limiting step; an annular limiting groove is formed by inner peripheral wall of the anti-detachment hook, bottom wall of the clamping protrusion, and outer peripheral wall of the bearing disk; and an inner edge of the second horizontal extension rib (33) is hooked by and confined to the limiting groove;

the inner ring (7) has a deformation limiting part around the outer periphery of the inner membrane (2) and a snap-in positioning part extending upward from edge of the deformation limiting part; the snap-in positioning part is snapped in and squeezed within a

matching gap between the inner edge of the second horizontal extension rib (33) and the limiting groove.

8. The polishing head according to any one of claims 1 to 7, wherein the inner membrane (2) includes a second bottom plate (21), and a plurality of annular pressure chambers formed on the second bottom plate (21) at intervals from inside to outside;

the second bottom plate (21) is opposite to bottom wall of the outer membrane (3), with a reserved preset buffer gap therebetween.

9. The polishing head according to claim 8, wherein each pressure chamber is formed and enclosed by two opposite annular retaining ribs (22) and the second bottom plate (21), and an annular opening for connection with the main body (1) is formed between upper edges of the two annular retaining ribs (22);

the inner membrane (2) is detachably connected to bottom of the main body (1) through a pressing ring (8); the pressing ring (8) has an annular pressing portion and a connecting protrusion fixed to top of the annular pressing portion; the annular pressing portion presses against inner side of top walls of the two annular retaining ribs (22); and the connecting protrusion protrudes from the annular opening to connect with the main body (1);

a sealing lip (23) is provided along edge of the annular retaining rib (22) of the inner membrane (2); and the pressing ring (8) presses the sealing lip (23) against bottom wall of the main body (1).

10. A wafer polishing device, comprising the polishing head according to any one of claims 1 to 9.