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(54) Platen with web release apparatus

(57) Generally, a method and apparatus for releasing polishing material in a polishing system. In one embodiment, the apparatus includes a platen having one or more nozzles coupled thereto. The platen has a support surface adapted to support the polishing material. The nozzles are adapted to flow a fluid therethrough that places the polishing material in a spaced-apart relation to the platen. In another embodiment, the one or more nozzles further include a centerline that forms an acute angle with the support surface. In one embodiment, the method includes the steps of supporting at least a portion of the polishing material on the platen, supplying a fluid between the polishing material, and lifting the polishing material to a spaced-apart relation to the platen.

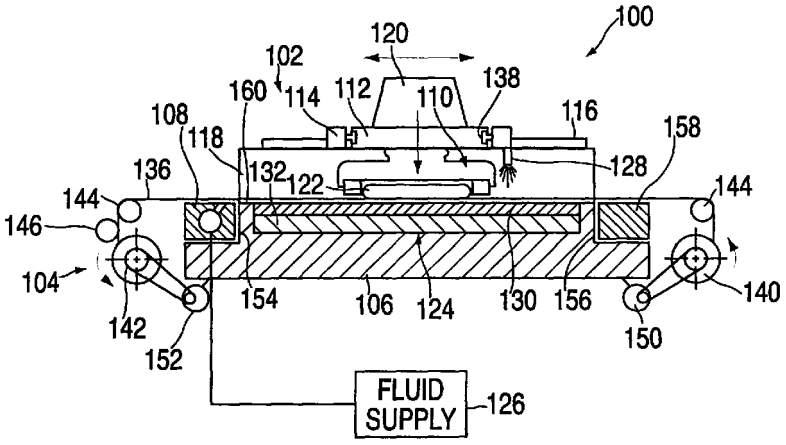

FIG. 1

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Description

[0001] Embodiments of the present invention relate generally to a web lift system and a method for releasing a web from a platen in a polishing system.

[0002] In semiconductor wafer processing, the use of chemical mechanical planarization, or CMP, has gained favor due to the enhanced ability to increase device density on a semiconductor workpiece, or substrate, such as a wafer. As the demand for planarization of layers formed on wafers in semiconductor fabrication increases, the requirement for greater system (*i.e.,* process tool) throughput with less wafer damage and enhanced wafer planarization has also increased.

[0003] An exemplary CMP system that addresses these issues is described in United States Patent No. 5,804,507, issued April 15, 1998 by Tolles et al. which discloses a CMP system having a planarization system that is supplied wafers from cassettes located in an adjacent liquid filled bath. A transfer mechanism, or robot, facilitates the transfer of the wafers from the bath to a transfer station. The transfer station generally contains a load cup that positions wafers into one of four processing heads mounted to a carousel. The carousel moves each processing head sequentially over the load cup to receive a wafer. As the processing heads are loaded, the carousel moves the processing heads and wafers through the planarization stations for polishing. The wafers are planarized by moving the wafers relative to a polishing material in the presence of polishing fluid. The polishing fluid typically contains chemicals that aid in the removal of material from the wafer. The mechanical aspect of the polishing process is generally provided by abrasives disposed either in the polishing fluid (i.e., slurry) or disposed on the polishing material. After completion of the planarization process, the wafer is returned back through the transfer station to the proper cassette located in the bath.

[0004] One type of polishing material that may be utilized for chemical mechanical polishing is known as a fixed abrasive material. The fixed abrasive material comprises a plurality of abrasive particles suspended in a resin binder that is disposed in discrete elements on a backing sheet. As the abrasive particles are contained in the polishing material itself, systems utilizing fixed abrasive material generally use polishing fluid that does not contain abrasives. Such polishing fluids enhance the service life of the fluid delivery systems.

[0005] Fixed abrasive polishing material is generally available in stick-down form but is often utilized in the form of a web. Generally, the web is supported by a platen having a central or working area where the polishing process is performed. The unused portion of the web that is not disposed on the platen is stored in a roll coupled to the side of the platen. As the web is consumed over the course of polishing a number of wafers, the web is advanced to place an incremental length of unused web in the working area of the platen. The used portion of the web leaving the platen is generally wound on a take-up roll that is disposed on the side of the platen opposite the supply roll.

[0006] However, indexing web across a polishing platen is sometimes difficult. The polishing fluids that come in contact with the web may cause surface tension or attraction to develop between the web and the underlying surface of the platen. This surface tension must be cover-come by the web indexing means during the advancement of the web. If the attraction between the web and platen is great, the indexing means may not be able to index the web or the web may become damaged during the indexing process.

[0007] Therefore, there is a need for a system and method for overcoming the attraction of a web to a platen in a polishing system.

[0008] One aspect of the invention generally provides an apparatus for releasing a web of polishing material. In one embodiment, the apparatus includes a platen having one or more nozzles coupled thereto. The platen has a support surface adapted to support the polishing material. The nozzles are adapted to flow a fluid therethrough to the backside of the polishing material that urges the polishing material at least partially away from the platen. In another embodiment, the one or more nozzles further include a centerline that forms an acute angle with the support surface that directs the flow from the nozzles towards the center of the platen.

[0009] In another aspect of the invention, method releasing a web of polishing material is provided. In one embodiment, the method includes the steps of supporting at least a portion of the polishing material on the platen, supplying a fluid between the polishing material, and urging at least a portion of the polishing material away from the platen. In one embodiment, the web is moved into a spaced-apart relation to the platen.

[0010] According to a mayor aspect of the invention, an apparatus for releasing a web of polishing material comprises a platen having a support surface adapted to support the polishing material; and one or more nozzles coupled on the platen, the nozzles adapted to flow a fluid therethrough that urges the polishing material at least partially away from the platen.

[0011] According to a preferred aspect of the invention, the one or more nozzles places the polishing material in a spaced-apart relation relative to the platen.

[0012] According to a preferred aspect of the invention, the one or more nozzles have a centerline that forms an acute angle with the support surface.

[0013] According to a preferred aspect of the invention, the apparatus further comprises a nozzle body having at least one nozzle disposed therein, the nozzle body having a top surface substantially coplanar to the support surface.

[0014] According to a preferred aspect of the invention, the support surface further comprises a recess having the nozzle body disposed therein.

[0015] According to a preferred aspect of the inven-

tion, the support surface further comprises a first end having a recess, the nozzle body is disposed in the recess.

[0016] According to a preferred aspect of the invention, the support surface further comprises a groove coupled to a vacuum port, the groove disposed in support surface.

[0017] According to a preferred aspect of the invention, the apparatus further comprises a nozzle body having at least one nozzle disposed therein, and a groove disposed in the platen, the nozzle body comprising at least a portion of at least one wall of the groove.

[0018] According to a preferred aspect of the invention, the nozzle body further comprises a top surface adapted to support the polishing material; and a side in communication with the groove, the one or more nozzles disposed in the side of the nozzle body.

[0019] According to a preferred aspect of the invention, the nozzle body further comprises a side in communication with the groove; and a top surface adapted to support the polishing material, the one or more nozzles disposed in the top surface of the nozzle body. According to a preferred aspect of the invention, the nozzle body comprises a plurality of nozzles.

[0020] According to a preferred aspect of the invention, the apparatus further comprises a first nozzle body disposed on a first side of the platen; and a second nozzle body disposed on an opposing second side of the platen.

[0021] According to a preferred aspect of the invention, the first and second nozzle bodies have a top surface substantially coplanar to the support surface.

[0022] According to a preferred aspect of the invention, the nozzle has a diameter of about 0.03 to about 0.13 inches.

[0023] According to a preferred aspect of the invention, the one or more nozzles comprise three nozzles.

[0024] According to a preferred aspect of the invention, the fluid is air or nitrogen.

[0025] According to a preferred aspect of the invention, the fluid is supplied at about 30 to about 50 pounds per square inch.

[0026] According to a mayor aspect of the invention, an apparatus for releasing a web of polishing media having a polishing side and a backside comprises a platen having a support surface adapted to support the polishing material; and a means for placing at least a portion of the polishing material in a spaced-apart relation to the platen.

According to a preferred aspect of the invention, the means further comprises one or more jets of fluid projecting upwards from the platen.

[0027] According to a mayor aspect of the invention, an apparatus for releasing a polishing material comprises a platen having a top surface; a groove formed in the top surface of the platen, the groove coupled to a vacuum port; one or more nozzles coupled to the platen, the nozzle adapted to flow a fluid that places at least a portion of the polishing material in a spaced-apart relation to the polishing material.

[0028] According to a preferred aspect of the invention, the one or more nozzles have a centerline that forms an acute angle with the support surface.

[0029] According to a preferred aspect of the invention, the apparatus further comprises a body having at least one nozzle disposed therein, the body having a top surface substantially coplanar to the support surface.

[0030] According to a preferred aspect of the invention, the at least one nozzles further comprise three nozzles disposed at one end of the platen.

[0031] According to a mayor aspect of the invention, a method for releasing polishing material from a platen comprises the steps of supporting at least a portion of the polishing material on the platen; supplying a fluid between the polishing material; and lifting at least a portion of the polishing material to a spaced-apart relation to the platen.

[0032] According to a preferred aspect of the invention, the step of supplying a fluid further comprises angling a stream of the fluid at an acute angle with the platen.

[0033] According to a preferred aspect of the invention, the step of supplying further comprises flowing at least a portion of the fluid towards the center of the platen.

[0034] According to a preferred aspect of the invention, the step of supplying further comprises flowing at least a portion of the fluid normal to the platen.

[0035] According to a preferred aspect of the invention, the step of supplying further comprises impacting the polishing material with a jet of fluid.

[0036] According to a preferred aspect of the invention, the step of supplying further comprises flowing air or nitrogen through one or more nozzles disposed at least partially under the polishing material.

[0037] According to a preferred aspect of the invention, the air or nitrogen flowing through one or more nozzles has a supply pressure of about 30 to about 50 pounds per square inch.

[0038] According to a preferred aspect of the invention, a further step of advancing the polishing material across the platen is provided.

[0039] The teachings of the present invention can be readily understood by considering the following detailed description of embodiments in conjunction with the accompanying drawings, in which:

Fig. 1 is an elevation of a chemical mechanical planarization system of the invention;

Fig. 2 is a sectional view of one embodiment of a platen;

Fig. 3 is a partial sectional view of the platen taken along section line 2--2 of Fig. 2 depicting one embodiment of a lift system;

Fig. 4 is a partial sectional view of the lift system

taken along section line 4--4 of Fig. 2;

Fig. 5 is a partial sectional view of another embodiment of a lift system;

Fig. 6A and 6B are sectional views of a platen illustrating a web in a processing and a spaced-apart orientation.

Fig. 7 is a sectional view of another embodiment of a lift system; and

Fig. 8 is an elevation of another chemical mechanical polisher having a lift system.

[0040] Fig. 1 depicts a plan view of one embodiment of a chemical mechanical polisher 100 incorporating at least one lift apparatus 108. One polisher 100 that may be adapted to benefit from the present invention is a FLATLAND® 8200 Chemical Mechanical Polisher, manufactured by Applied Materials, Inc., located in Santa Clara, California. Although the lift apparatus 108 is described on one configuration of a chemical mechanical polisher, one skilled in the art may advantageously adapt lift apparatus 108 as taught and described herein to be employed on other chemical mechanical polishers that utilize webs or pads of polishing material.

[0041] An exemplary polisher 100 that may be adapted to benefit from the invention is generally described in United States Patent Application No. 60/185,812, filed February 29, 1999, to Sommer. The polisher 100 generally comprises having a drive system 102, a polishing media magazine 104 and a platen 106 having one or more lift systems 108. The drive system 102 generally includes a polishing head 110 that retains a substrate 122 during processing. The polishing media magazine 104 generally includes a web 136 of polishing material that is disposed between a supply roll 140 and a take-up roll 142 across the platen 106. The polishing head 110 holds the substrate 122 against portion of the web 136 disposed on the platen 106 while the drive system 102 moves the polishing head 110 and substrate 122 in a polishing pattern relative to the web 136.

[0042] One embodiment of a polishing media magazine 104 that may be adapted to benefit from the invention is generally described in United States Patent Application No. 08/833,278, filed April 4, 1997, by Donohue et al. The polishing media magazine 104 generally tensions, conditions and advances the web 136 of polishing material across the platen 106. Although the polishing media magazine 104 generally is described handling a web 136 comprising fixed abrasive polishing material (such as available from Minnesota Manufacturing and Mining Company, Saint Paul, Minnesota), the lift apparatus 108 find similar utility with conventional foamed polyurethane polishing material (such as available from Rodel Inc., Newark, Delaware). The reader should also note that the lift apparatus 108 may additionally be utilized in polishers having stick-down pads of polishing material to assist in removing the pads from the polishing.

[0043] Generally, an unused portion of the web 136 is wound on the supply roll 140 while the used portion is wound on the take-up roll 142. The supply roll 140 and the take-up roll 142 are respectively coupled to a drive 150, 152 that both tension and indexes the web 136 across the platen 106 between the rolls 140, 142. The drives 150, 152 may be a stepper motor, air motor, servo motor or the like.

[0044] The polishing media magazine 104 generally includes a guide member 144 disposed on each side of the platen 106. The guide members 144 position the web 136 in a substantially parallel orientation adjacent to platen 106. As the portion of the web 136 disposed on the platen 106 is consumed during the polishing process, the web 136 is incrementally advanced across the platen 106. The advancement of the web 136 moves a new, unused portion of the web 136 from the supply roll 140 to the top of the platen 106 while removing a used portion of the web 136 which is wound the take-up roll 142.

[0045] The polishing media magazine 104 also includes a conditioner 146. The conditioner 146 generally maintains the surface of the web 136 in a state that produces uniform polishing results. For example, in the case of a web 136 comprising fixed abrasives, the web 136 must be conditioned prior to use to uniformly expose abrasive particles entrained in a plurality of abrasive element disposed on the web 136. The conditioner 146, that may comprise a brush, a cylinder having a smooth or textured surface or other surface, is placed in contact with the web 136 to dress the surface of the web 136 before that portion of the web 136 come in contact with the substrate 122. Such conditioners 146 are generally provided with conventional polishing systems.

[0046] One embodiment of a drive system 102 that may be adapted to benefit from the invention is generally described in United States Patent Application No. 08/961,606, filed October 31, 1997, by Sommer. The drive system 102 generally provides motion to the polishing head 110 relative to the web 136 of polishing material. The drive system 102 generally includes a stage 114 and a carrier plate 112. The stage 114 moves linearly along the lay of the web 136 on two parallel rails (and bearings) 116 (only one is shown). Each rail 116 is mounted to a support 118 that is coupled to the platen 106. A first driver (not shown) is coupled the stage 114 and controls the motion of the stage 114 along the rails 116. The first driver may include one or more "Sawyer" motors, ball screws, cylinders, belts, rack and pinion gears, servo motors, stepper motors and other devices for creating and controlling linear motion. Generally, one portion of the first driver is connected to the support 118 while a second portion is connected to the stage 114.

[0047] The carrier plate 112 is typically coupled to the stage 114 by two parallel rails (and bearings) 138. The rail 138 is mounted between carrier plate 112 and stage 114, permitting the carrier plate 112 to move perpendicularly relative to the motion of the stage 114. A

second driver (not shown) is typically coupled the carrier plate 112 and controls the motion of the carrier plate 112 along the rails 138. The second driver is typically configured similarly to the first driver. Generally, one portion of the second driver is connected to the carrier plate 112 while a second portion is connected to the stage 114.

[0048] The carrier plate 112 generally supports the polishing head 110. The polishing head 110 is coupled to an actuator (not shown) so that the substrate retained in the polishing head may be placed in contact with the web 136 during polishing. Examples of polishing heads that may be utilized in the polisher 100 are a TITAN HEAD™ wafer carrier and a DIAMOND HEAD™ wafer carrier, both manufactured by Applied Materials, Inc., of Santa Clara, California. In one embodiment, combined motion of the stage 114 and carrier plate 112 results in x-y or orbital polishing motion of substrate 112 held in the polishing head 110 relative the web 136.

[0049] One or more nozzles 128 are generally disposed in the polisher 100 to provide a polishing fluid between the substrate 122 and web 136 during polishing. The nozzle 128 may be coupled to the drive system 102, the platen 106 or located in other positions where the flow of polishing fluid from the nozzle 128 is directed onto the web 138. The polishing fluid generally includes de-ionized water and optionally one or more chemical reagents that aid in the removal of material from the wafer. Optionally, the polishing fluid may include abrasives.

[0050] The platen 106 is generally a flat surface on which the substrate 122 is polished. The platen 106 typically is comprised of aluminum. The platen 106 has a top surface 160 that supports the web 136. The top surface 160 includes a center recess 124 and a first side recess 154 and a second side recess 156. A subpad 130 and a subplate 132 are disposed in the center recess 124. The subpad 130 is typically plastic, such as polycarbonate or foamed polyurethane. Generally, the hardness or durometer of the subpad 130 (in combination with the subplate 132) may be chosen to produce a particular polishing result. The subpad 130 generally maintains the web 136 of polishing material parallel to the plane of the substrate 122 held in the polishing head 110 and promotes global planarization of the substrate 122. The subplate 132 is positioned between the subpad 130 and the bottom of the recess 124 such that the upper surface of the subpad 130 is included (*i.e.,* coplanar) with the top surface 160 of the platen 106.

[0051] At least one of the side recesses 154, 156 houses a lift apparatus 108. The lift apparatus 108 generally is coupled to a fluid supply 126. The lift apparatus 108 may be activated to provide a fluid, such as air, nitrogen and the like, between the platen 106 and the web 136 to urge the web 136 away from the platen 106. The fluid flowing from the lift apparatus 108 releases the attraction (for example, film attraction or surface tension due to fluid beneath the web) between the web 136 and the platen 106. In one embodiment, the fluid from the lift apparatus 108 places the web 136 in a spaced-apart relation relative to the platen 106.

[0052] Generally, the one or more lift apparatus 108 may be disposed proximate one or more edges of the platen 106. In one embodiment, one lift apparatus 108 is disposed in the recess 154 of the platen 106 proximate the take-up roll 140. Typically, a blank 158 is disposed in the second recess 156. Optionally, another lift apparatus 108 may be disposed in the second recess 156 in place of the blank 158, on one or both adjacent sides of the platen 106, or a combination thereof.

[0053] Fig. 2 depicts a plan view of one embodiment of the platen 106. The top surface 160 of platen 106 generally has a first side 202 adjacent the supply roll 140, a second side 204 adjacent the take-up roll 142 arid a pair of lateral sides 206. The top surface 160 of the platen 106 additionally includes a groove 208 disposed proximate the edges of the platen 106 that underlies the web 136 of polishing material. The groove 208 includes two channels 210 formed in top surface 160 near the lateral sides 206 of the platen 106. The groove 208 also includes two channels 212 that may comprise a portion of the side recesses 154, 156. Optionally, the channels 212 may be formed in the top surface 160 inwards of the recesses 154, 156.

[0054] Referring to the sectional view of Fig. 3, in one embodiment of the groove 208, the channel 212 is defined between a side wall 302 of the recess 154 and a first side 312 of the lift apparatus 108. The channel 212 communicates with a port 304 that is coupled to a vacuum source 306. The vacuum source 306 selectively provides a vacuum to the groove 208 that secures the web 136 to the platen 106 during processing. An example of a polishing material retention system utilizing a groove in the platen is disclosed in United States Patent Application Serial No. 09/258,036, filed February 25, 1999, by Sommer et al. The reader should note that other types of devices may be utilized to releasably fix the polishing material 252 to the platen 230, such as, for example, releasable adhesives, bonding, electrostatic chucks, mechanical clamps and other releasable retention mechanisms.

[0055] The lift apparatus 108 that defines one side of the channel 212 generally includes one or more nozzles 330 for flowing a fluid therethrough. The fluid from the supply 126 exiting the nozzle 300, urges the web 108 from the platen 106, overcoming the attraction between the web 108, platen 106 and subpad 130, and any surface tension therebetween due to fluids (*e.g.,* polishing fluid) that may be present under the web 138.

[0056] In one embodiment, the lift apparatus 108 comprises a body 308 having the first side 312, a second side 314, a top surface 310 and a bottom 316. A plurality of fasteners 318 are disposed through a mounting hole 224 from the top surface 310 of the body 308 and thread into a mating threaded hole 320 disposed in the first recess 154. A sealant or gasket (not shown) is

generally used between the lift member 108 and platen 106 to prevent leakage therebetween. Alternatively, the lift apparatus 108 may be secured to the platen 106 utilizing other means such as screws, rivets, clamps, adhesives and the like.

[0057] Typically, the second side 314 and the top surface 310 of the body 308 form a corner 322 having a radius or chamfer. The radius of the corner 322 minimizes particulate generation or the probability of damage to the web 136 as the web 136 moves thereover.

[0058] A passage 228 is disposed through the body 308. One or more apertures 226 are disposed in the body 308 and intersect the passage 228. Typically, the apertures 226 terminate in the nozzle 330 that is disposed on the first side 312 of the body 308. Generally, the aperture 226 is disposed on an angle a that is at an acute angle with the top surface 160 of the platen 106. The orientation of the aperture 226 generally points inwardly towards the center portions of the platen 106. The orientation of the aperture 226 additionally is such that the extended diameter of the aperture 226 clears a top corner 332 of the opposite wall of the groove 208.

[0059] Alternatively, the nozzle 330 may be disposed on the top surface 310 of the body 308. Configurations of the lift assembly 108 having the nozzle 300 disposed in the top surface 310 of the body 308 are particularly useful in platens not having a groove disposed therein.

[0060] In one embodiment, at least three nozzles 330 are disposed in the body 308. About 30 to about 50 pounds per square inch of fluid pressure is supplied to the nozzles 330 that have a diameter of about 0.03 to about 0.13 inches. If too high pressure or flow rate is supplied to the nozzles 330, the flow may undesirably cause the web 136 to vibrate.

[0061] Referring additionally to Fig. 4, in one embodiment of the lift apparatus 108, the passage 228 has a first end 402 and a second end 404. A plug 406 is disposed in the first end 402 to prevent fluid disposed within the passage 228 from exiting through the first end 402. A fitting 408 is disposed in the second end 404 of the passage 226. The fitting 408 generally facilitates coupling the passage 226 to the fluid supply 126.

[0062] Fig. 5 depicts another embodiment of a lift system 500. Generally the lift system 500 is disposed on the platen 106 similar to the lift system 108 described in reference to Figs. 1-4. The lift system 500 comprises a body 502 having one or more nozzles 504 disposed therein. Each nozzle 504 is coupled by an aperture 506 to a port 508. A fitting 510 is disposed in port 508 and is coupled to a fluid supply 512. Optionally, a flow control mechanism 514, such as a regulator, orifice, proportional valve or the like, is disposed between the supply 512 and the port 508 to control the flow of fluid through the each nozzle 504. Thus, the lift of a web 516 disposed proximate the lift system 500 may be tuned to lift one portion of the web 516 more than another, or to ensure uniform flow through all nozzles 504 comprising the lift system 500. For example, in a lift system comprising three or more nozzles 504, the center nozzles may have a higher flow rate to provide more fluid (*e.g.*, air) under the center of the web 516. The higher flow rate in the center correspondingly generates a greater lifting force to overcome fluid tension in the center of a platen 518 that is located furthest from the nozzles 504. Alternatively, the fittings 510 in each port 508 may be coupled together, having a single fluid line coupling the fittings 510 to the fluid supply 512.

[0063] Referring to Figs. 6A and 6B, in operation, vacuum is applied to the groove 208. The vacuum in the groove 208 creates a downward force 602 that secures the web 136 to the platen during polishing (see Fig. 6A). Once polishing is complete and it is desirable to advance the web 136, the vacuum is removed from the groove 208 (*i.e.*, pressure applied to the groove or the groove vented to atmosphere) and a fluid is supplied to the lift apparatus 108 from the fluid supply 126. The fluid from the supply 126 is flown into the body 308 and out the nozzle 330 as a stream or jet of fluid 600. The fluid stream 600, typically air, impacts the web 138 and forces the web 130 away from the platen 106. Generally the stream 600 releases the web 138 from the platen 106 so that at least a portion of the web 138 is lifted from the platen 106. In one embodiment, the stream 600 lifts the web 138 into a spaced-apart relation relative the platen 106.

[0064] The angle α at which the stream 600 impacts the web 136 has a first vector 604 that provides an upward force. The stream 600 additionally has a second vector 606 that forces the flow 600 towards the center portions of web 136, displacing liquids under the web 136 and overcoming the attraction of the web 136 to the platen 106 caused by surface tension and other forces. The angle α of the nozzles 330 allows the lift apparatus 108 to be positioned about the perimeter of the platen 106 and web 136, away from the polishing area (*i.e.*, the area over the subpad 140) that is sensitive to surface variations that could result in polishing non-uniformity. Additionally, the position of the lift apparatus 108 at the perimeter of the platen 106 aids in the simplicity of the design since complicated fabrication techniques to route air though the center of the platen 106, subpad 130 and subplate 132 are not required.

[0065] Fig. 7 depicts another polisher 700 that utilizes a web 702 disposed on a rotating platen 704. Generally, a polishing head 706 retains a substrate 708 against the platen 704 during polishing. At least one lift apparatus 710 is coupled to the platen 704. The lift apparatus 710 is configured similar to the lift apparatus 108 described in reference to Figs. 1-6B. One such polisher 700 that may be adapted to benefit from a lift apparatus 710 is described in United States Patent Application No. 09/244,456, filed February 4, 1999 to Birang et al. The lift apparatus 710 may be actuated to urge the web 702 from the platen 704. In one embodiment, the lift apparatus 710 places the web 702 in a

spaced-apart relation to the platen 704 to facilitate the advancement of the web 702.

[0066] Fig. 8 depicts another polisher 800 that utilizes a stick-down pad 802 of polishing material disposed on a rotating platen 804. Generally, a polishing head 806 retains a substrate 808 against the platen 804 during polishing. The lift apparatus 810 is coupled to the platen 804. One such polisher 800 that may be adapted to benefit from a lift apparatus 810 is described in United States Patent No. 5,804,507. The lift apparatus 810 may be actuated to lift the pad 802 from the platen 804, overcoming the adhesion therebetween, facilitating the periodic removal and replacement of the pad 802.

Claims

1. Apparatus for releasing a web of polishing material comprising:

   - a platen having a support surface adapted to support the polishing material; and
   - one or more nozzles coupled on the platen, the nozzles adapted to flow a fluid therethrough that urges the polishing material at least partially away from the platen.

2. The apparatus of claim 1, wherein the one or more nozzles places the polishing material in a spaced-apart relation relative to the platen.

3. The apparatus of claim 1, wherein the one or more nozzles have a centerline that forms an acute angle with the support surface.

4. The apparatus of claim 1 further comprising a nozzle body having at least one nozzle disposed therein, the nozzle body having a top surface substantially coplanar to the support surface.

5. The apparatus of claim 1, wherein the support surface further comprises a groove coupled to a vacuum port, the groove disposed in support surface.

6. The apparatus of claim 1 further comprising a nozzle body having at least one nozzle disposed therein, and a groove disposed in the platen, the nozzle body comprising at least a portion of at least one wall of the groove.

7. Apparatus for releasing a web of polishing media having a polishing side and a backside, the apparatus comprising:

   a platen having a support surface adapted to support the polishing material; and
   a means for placing at least a portion of the polishing material in a spaced-apart relation to the platen.

8. The apparatus of claim 7, wherein the means further comprises one or more jets of fluid projecting upwards from the platen.

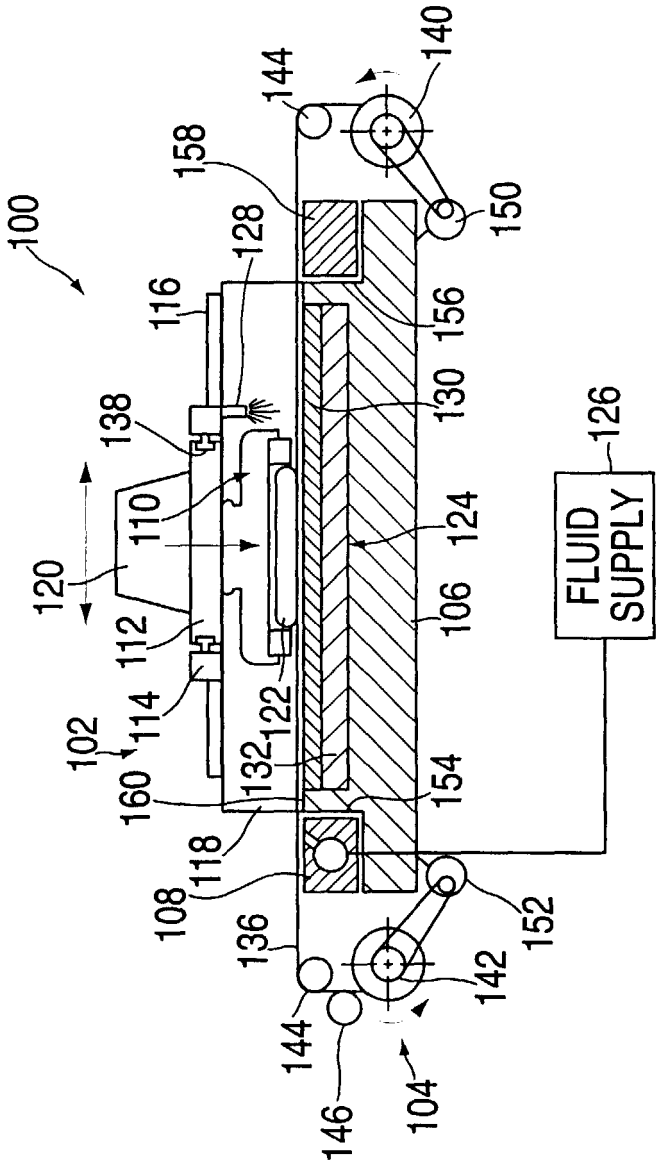
9. A method for releasing polishing material from a platen comprising the steps of supporting at least a portion of the polishing material on the platen; supplying a fluid between the polishing material; and lifting at least a portion of the polishing material to a spaced-apart relation to the platen.

10. The method of claim 9, wherein the step of supplying a fluid further comprises angling a stream of the fluid at an acute angle with the platen.

11. The method of claim 8, wherein the step of supplying further comprises flowing at least a portion of the fluid towards the center of the platen.

12. The method of claim 11, wherein the step of supplying further comprises flowing at least a portion of the fluid normal to the platen.

13. The method of claim 9, wherein the step of supplying further comprises impacting the polishing material with a jet of fluid.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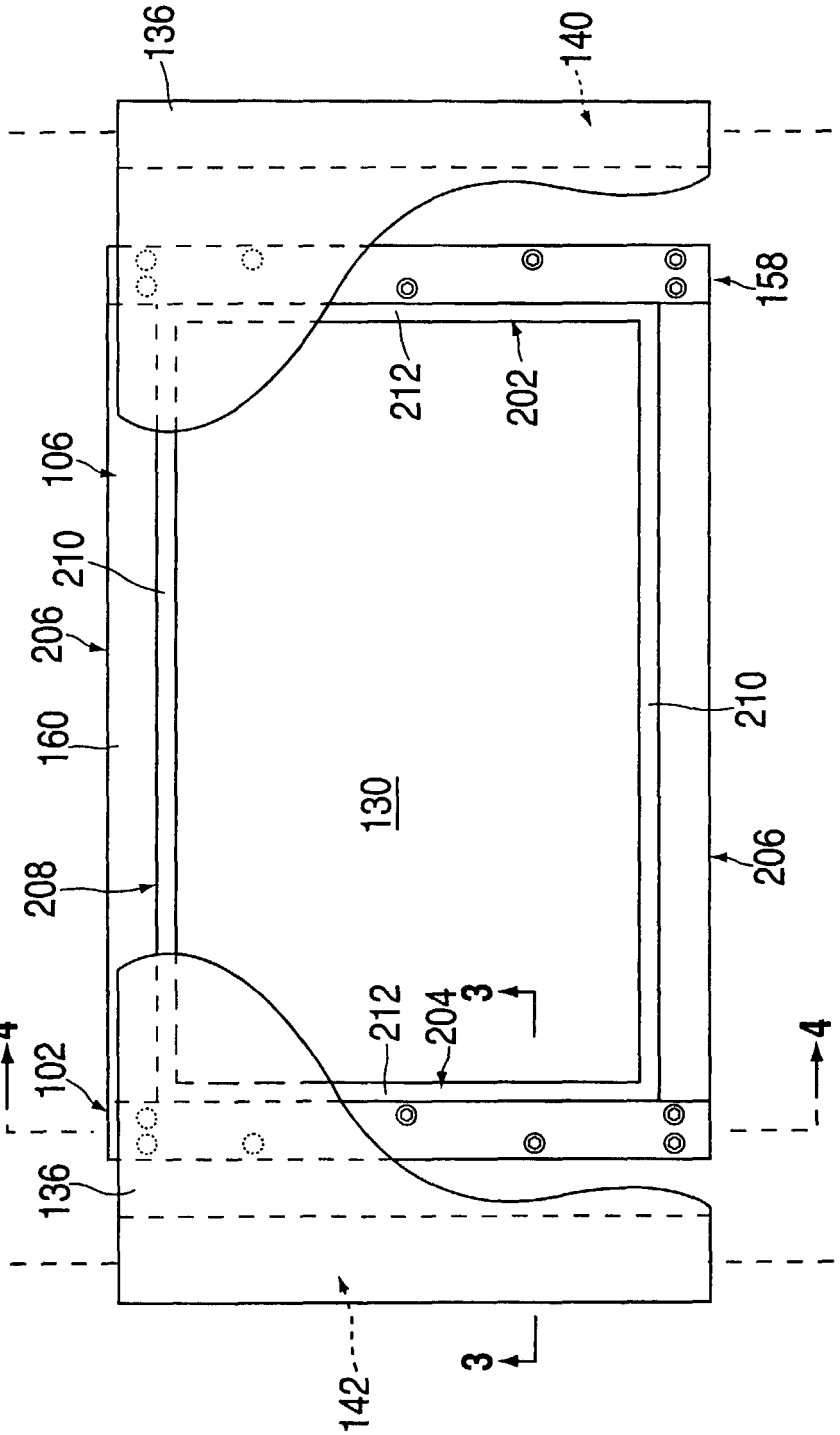
FLUID SUPPLY

FIG. 1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3

FIG. 2

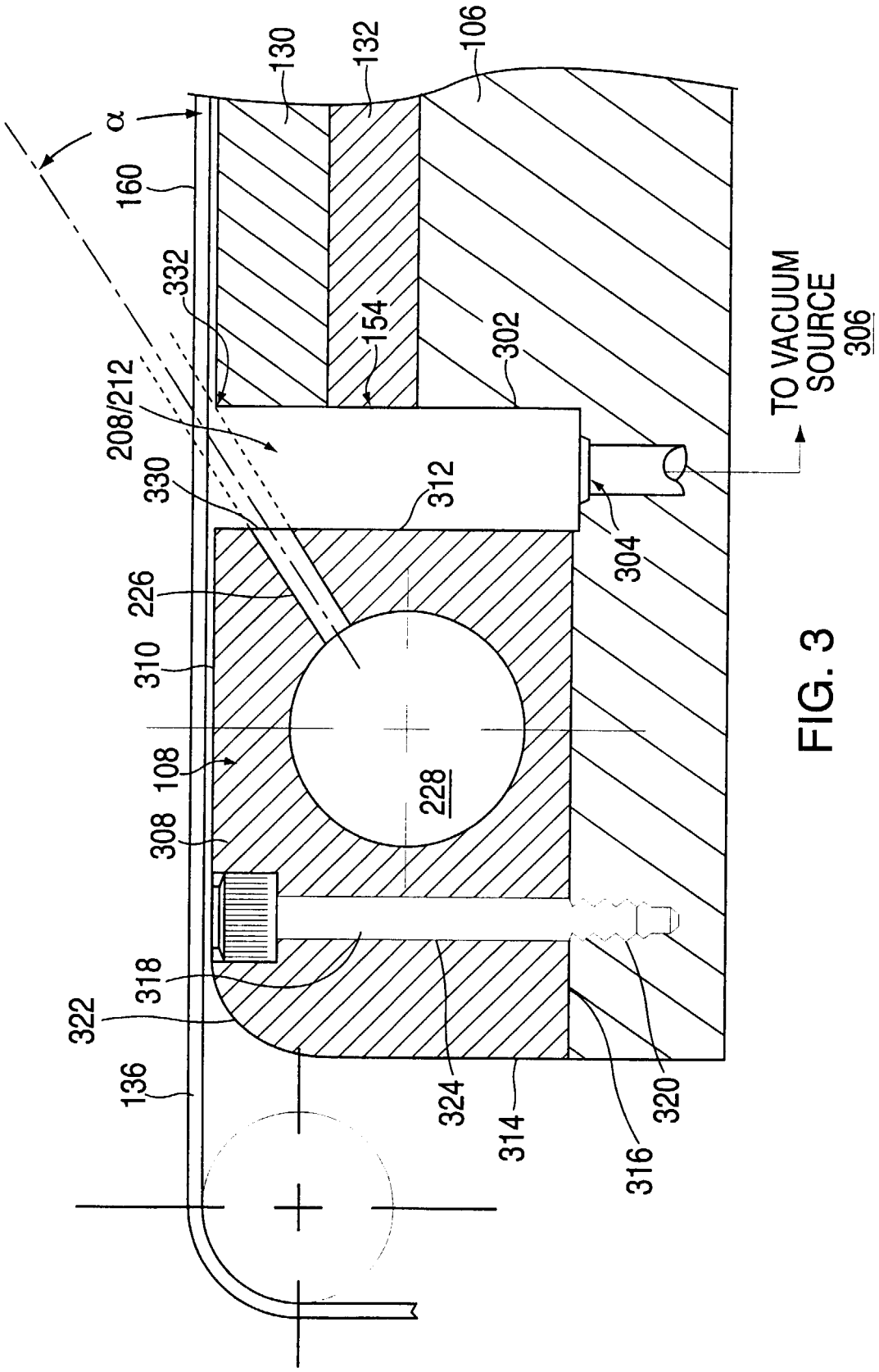
α
160
332
208/212
330
226
310
108
308
318
322
136
130
132
106
154
302
312
304
228
324
314
316
320
TO VACUUM SOURCE 306

FIG. 3

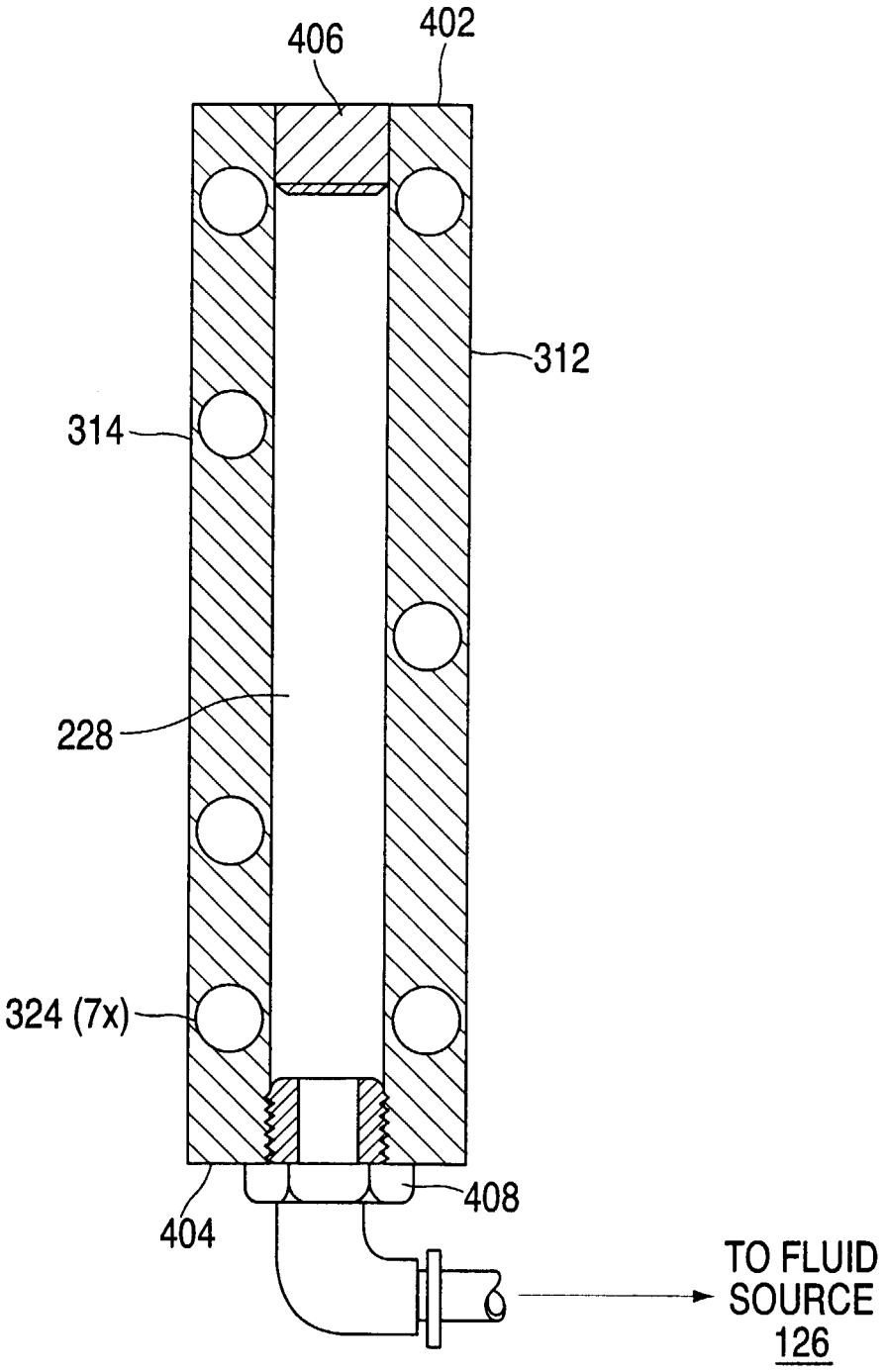

FIG. 4

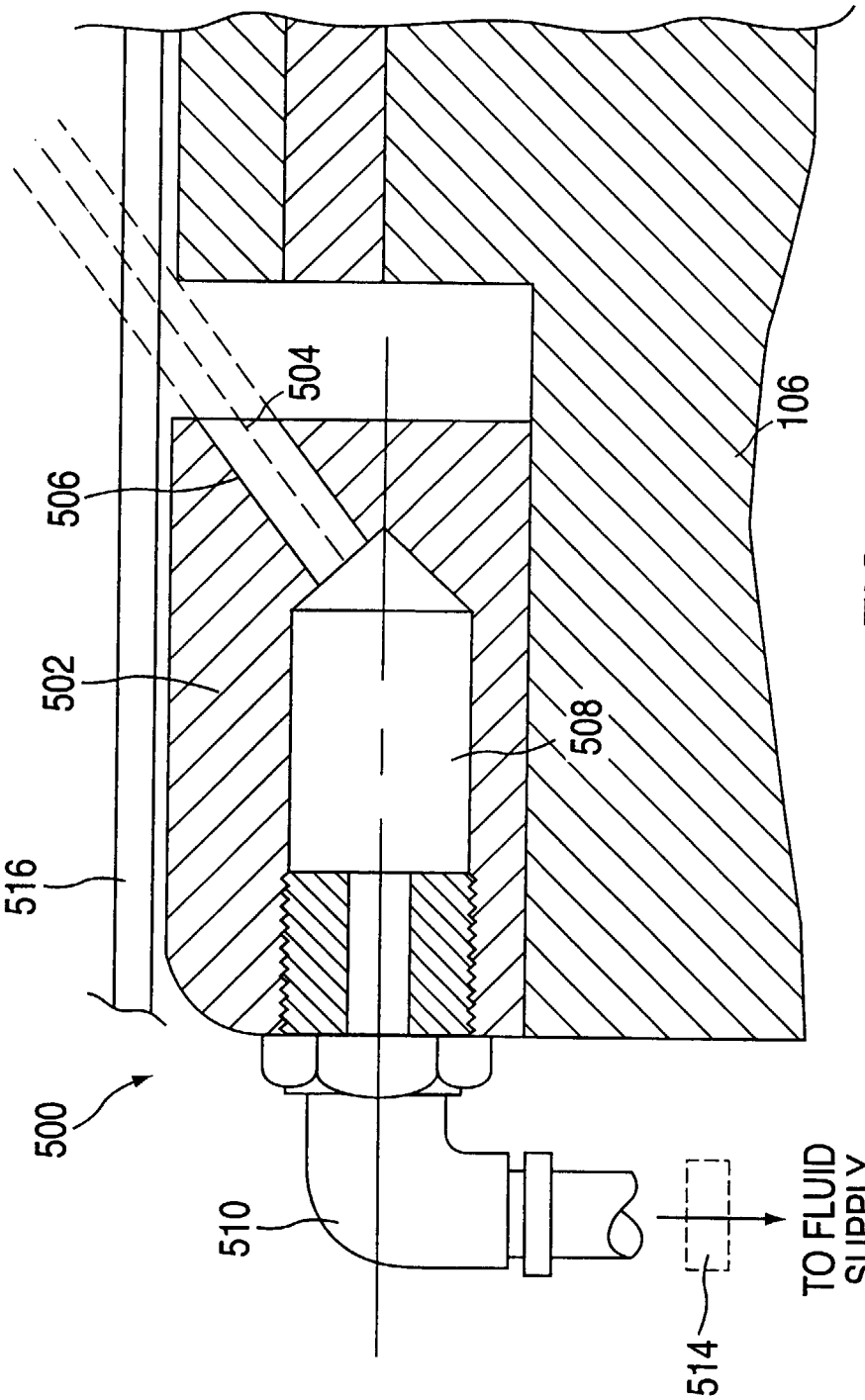

FIG. 5

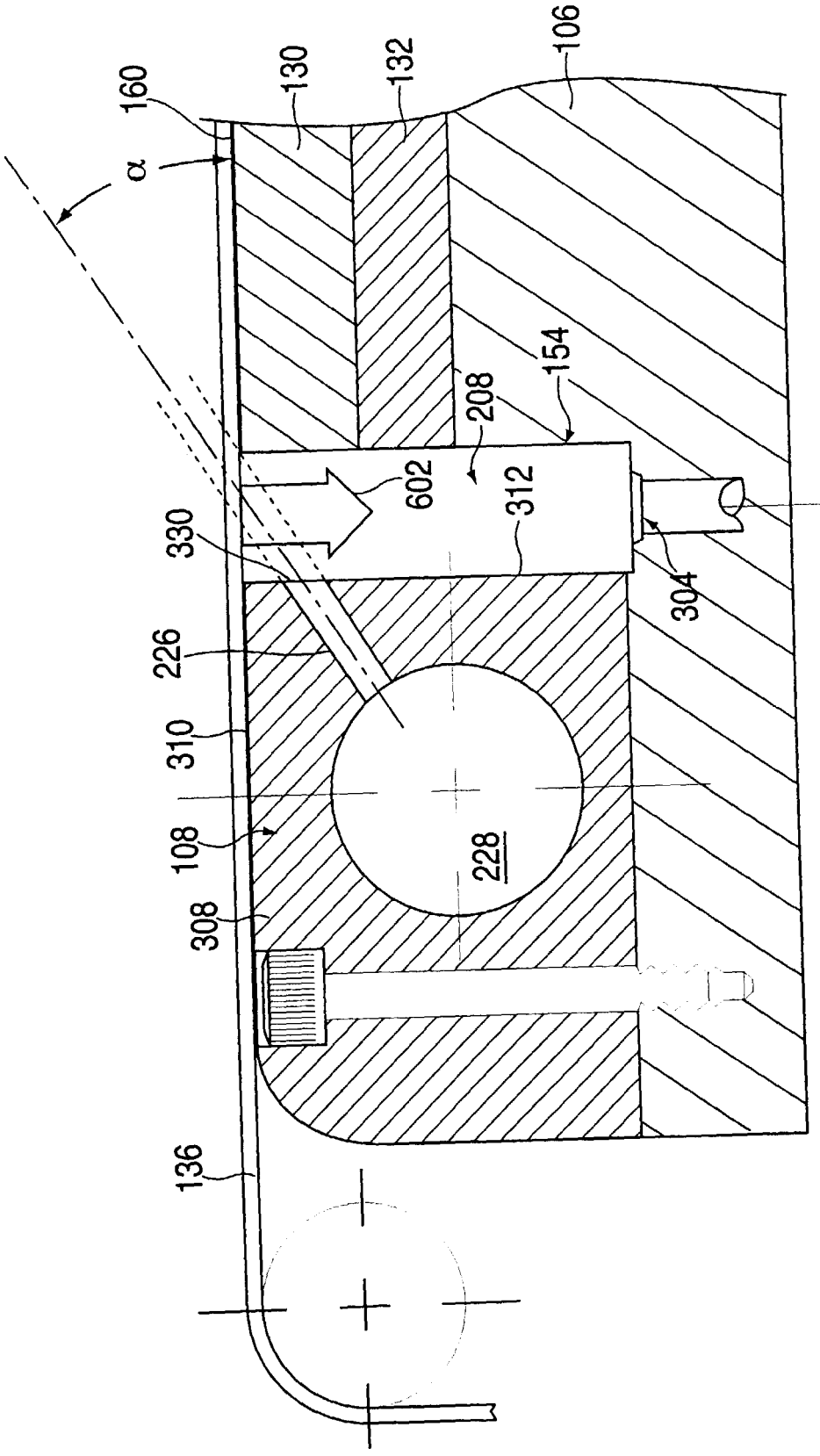
160
130
132
106
α
154
208
602
312
330
TO VACUUM SOURCE 306
304
226
310
108
228
308
136

FIG. 6A

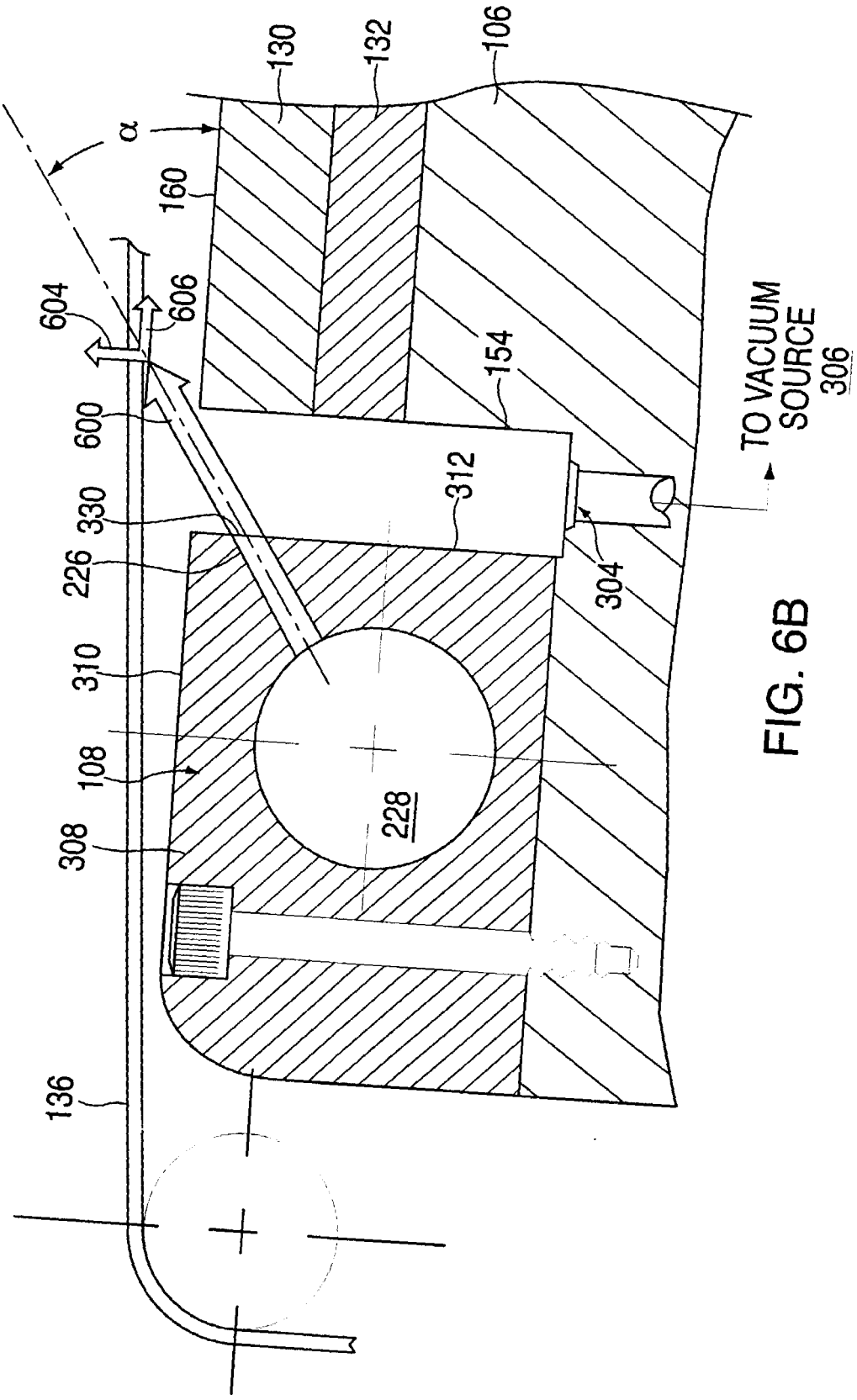
130
132
106
α
160
604
606
600
330
226
310
108
308
136
154
312
304
228
TO VACUUM SOURCE 306

FIG. 6B

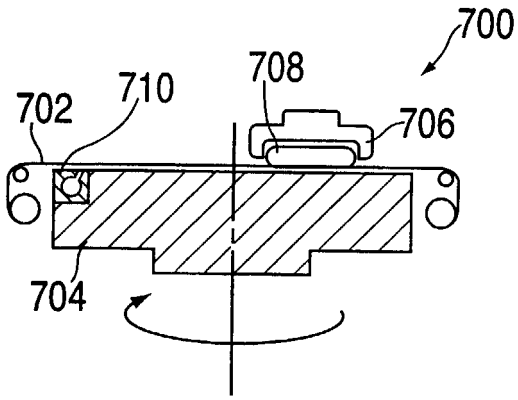

FIG. 7

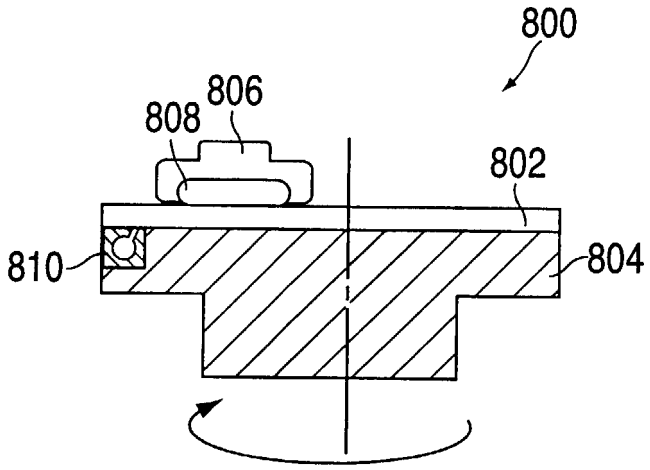

FIG. 8