US 20010006879A1

(19) United States

(12) Patent Application Publication (10) Pub. No.: US 2001/0006879 A1

Walker et al. (43) Pub. Date: Jul. 5, 2001

(54) METHOD AND APPARATUS FOR SUPPORTING A POLISHING PAD DURING CHEMICAL-MECHANICAL PLANARIZATION OF MICROELECTRONIC SUBSTRATES

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(21) Appl. No.: **09/795,283**

(22) Filed: **Feb. 27, 2001**

Related U.S. Application Data

(62) Division of application No. 09/387,065, filed on Aug. 31, 1999.

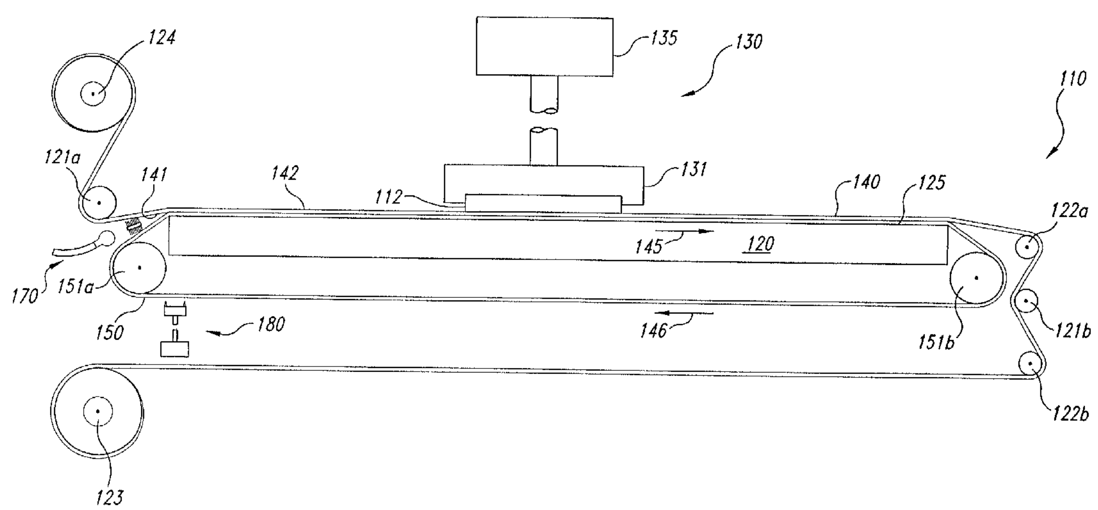
Publication Classification

(51) Int. Cl.[7] **B24B 21/04**; B24B 21/06

(52) U.S. Cl. **451/168**; 451/490

(57) ABSTRACT

A method and apparatus for planarizing a microelectronic substrate. In one embodiment, the apparatus can include an elongated polishing pad that is moved over a platen either between or during the planarization cycles, and a support pad that is moved along with the polishing pad. The support pad can be an elongated member that extends between a supply roller and a take-up roller, or can include a continuous member that extends around the spaced apart rollers. The platen can also be movable along with the support pad and can be supported by fluid jets, rollers, or a rotating bladder. Cleaning devices and/or milling devices can treat the surfaces of the polishing pad, the support pad and/or the platen to reduce the likelihood for contaminants to become caught between these components as they engage with each other.



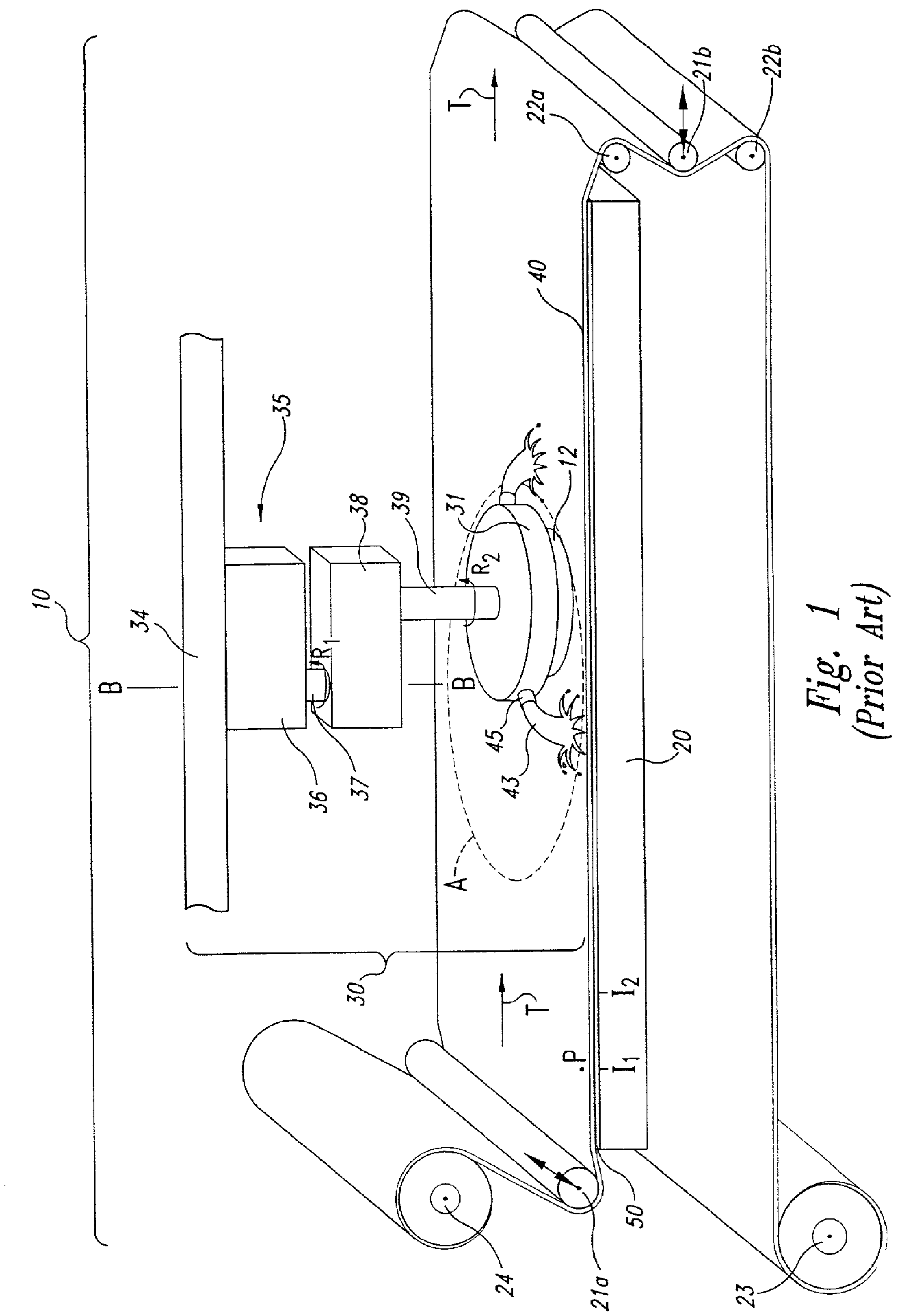


Fig. 1
(Prior Art)

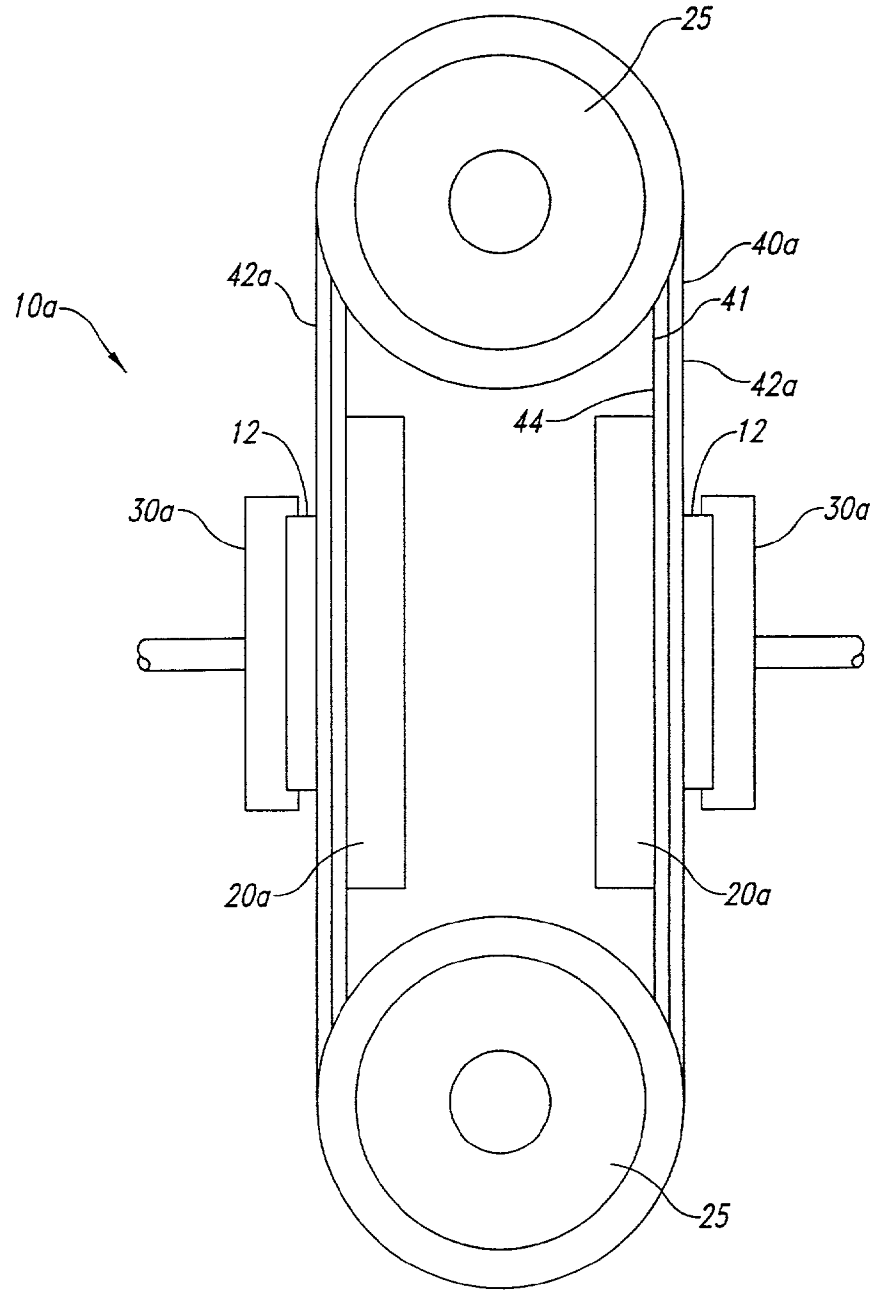
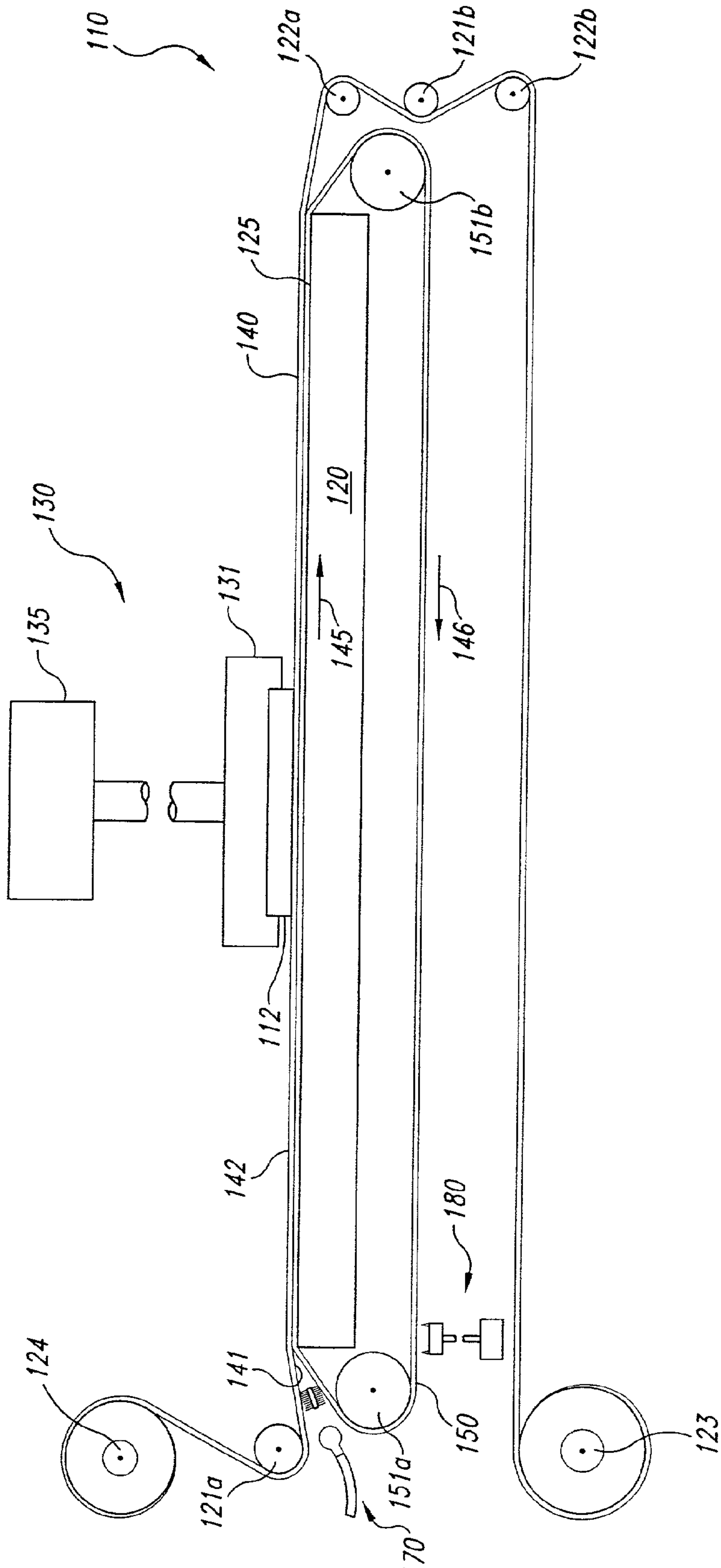


Fig. 2
(Prior Art)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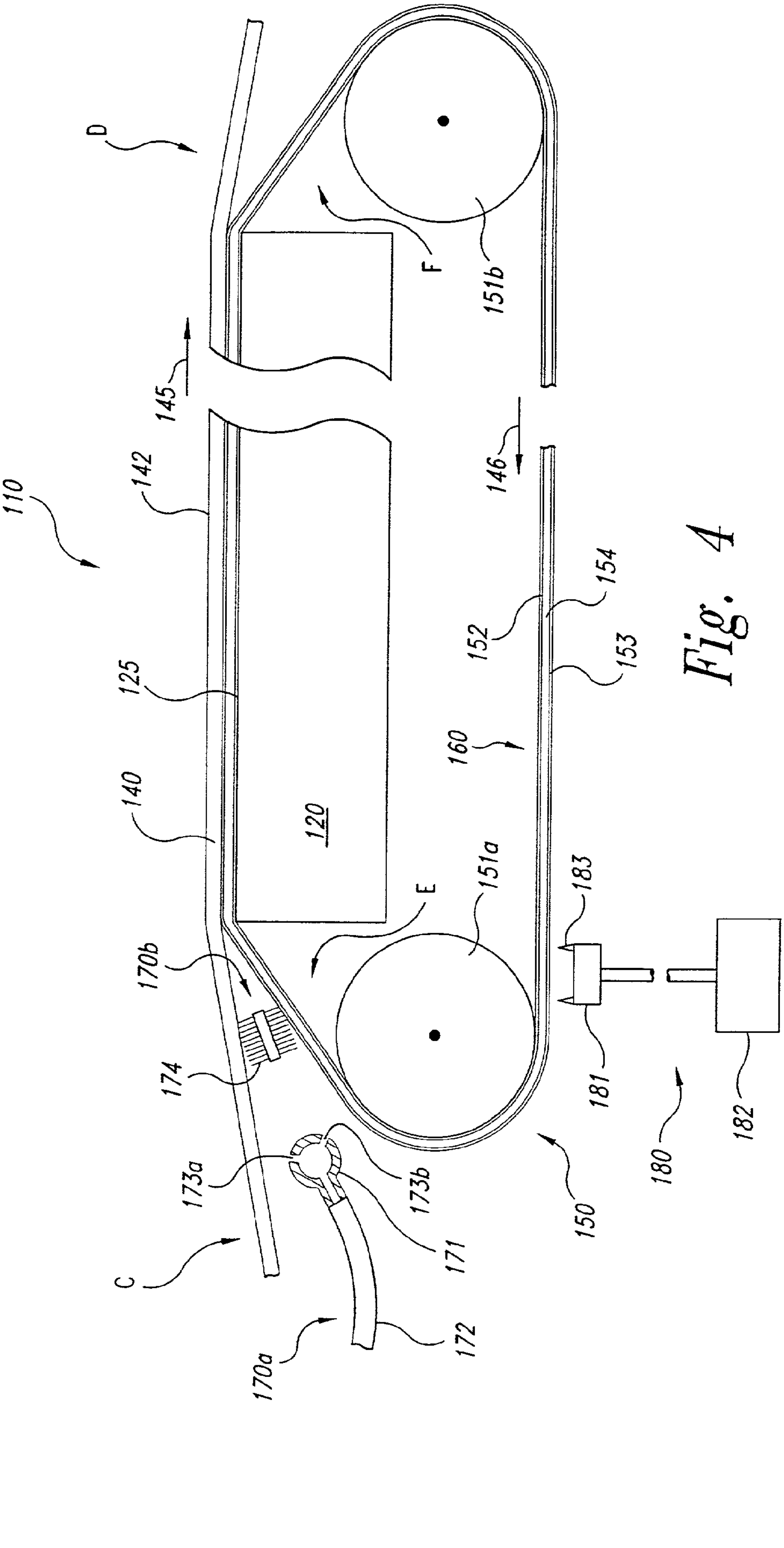
122a
121b
122b
151b
125
140
120
130
131
135
145
146
112
142
180
141
124
150
123
121a
151a
170

Fig. 3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D
C
E
F
120
125
140
142
145
146
150
151a
151b
152
153
154
160
170a
170b
171
172
173a
173b
174
180
181
182
183

Fig. 4

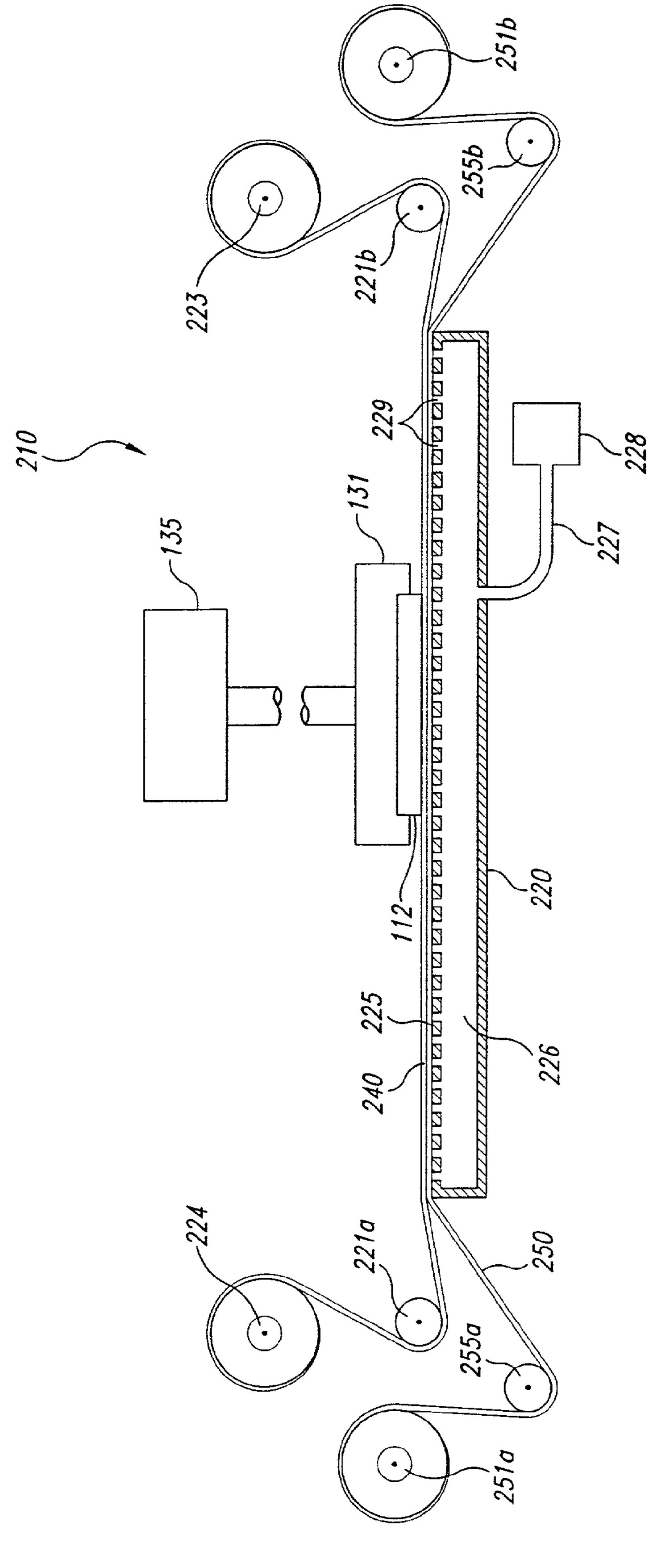
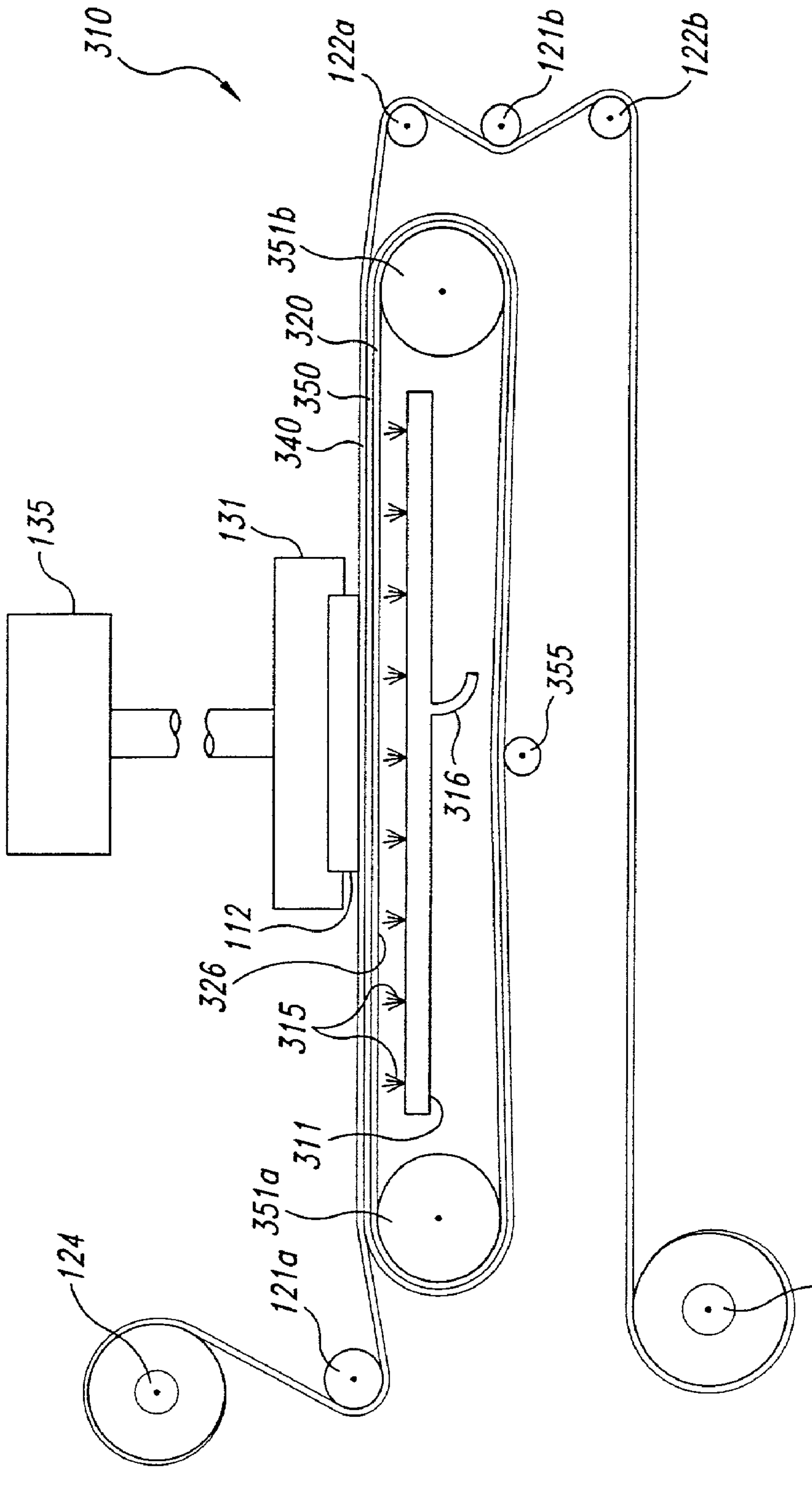

210
135
131
112
229
228
227
220
225
226
240
223
221b
255b
251b
224
221a
250
255a
251a

Fig. 5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122a
121b
122b
351b
320
350
340
135
131
355
316
112
326
315
311
351a
124
121a
123

Fig. 6

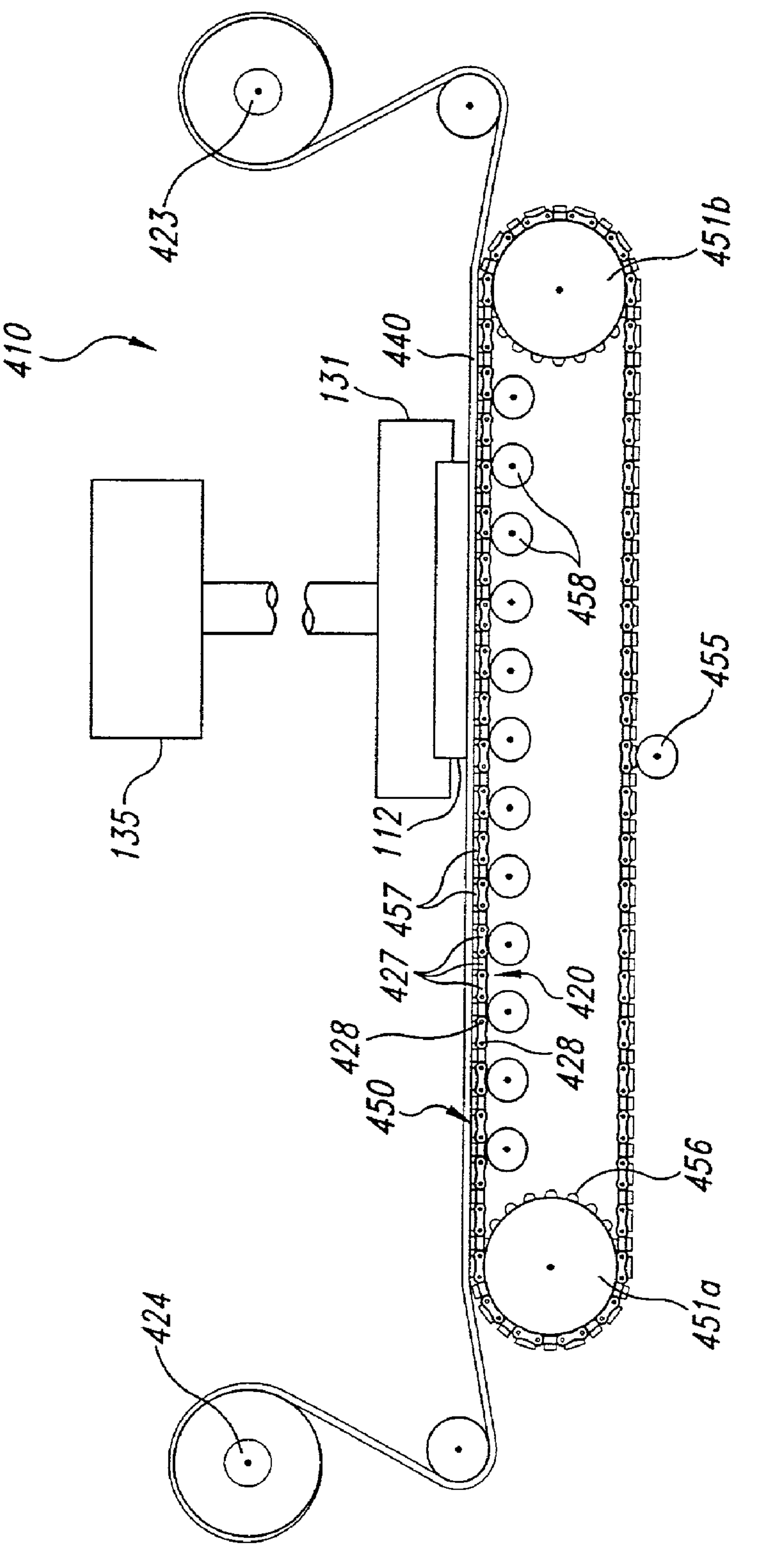
410
423
424
440
131
135
112
457
427
428
428
450
420
458
455
451b
451a
456

Fig. 7

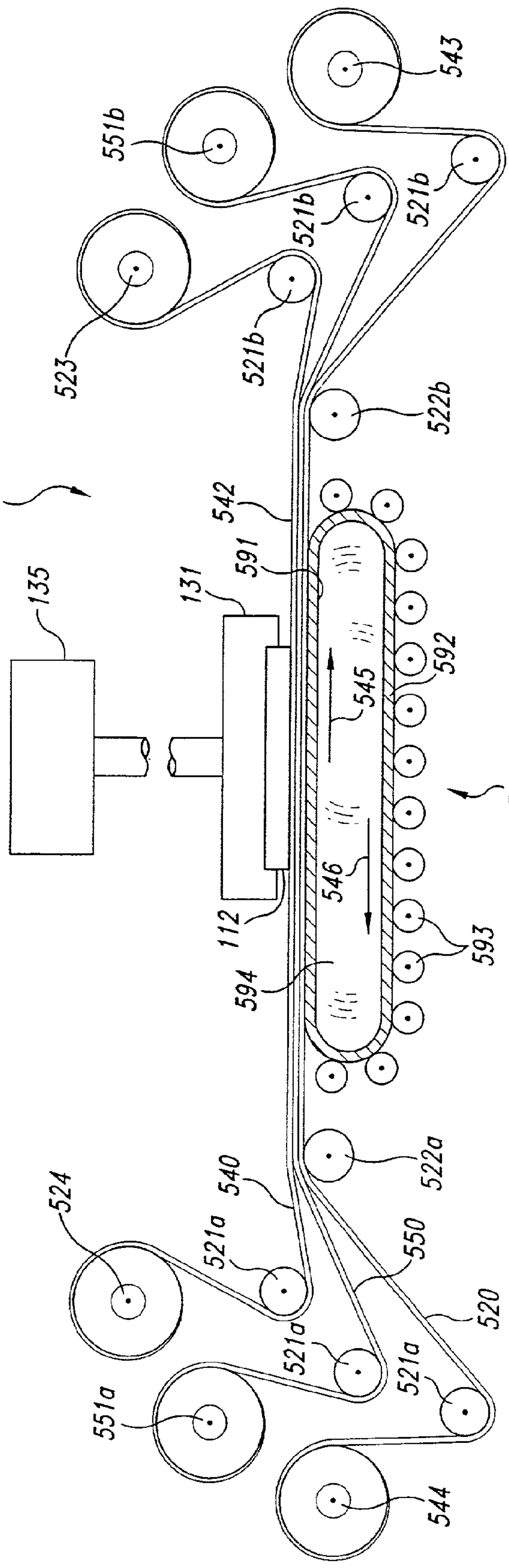
510
135
131
112
542
591
594
545
546
590
592
593
543
551b
521b
521b
521b
523
522b
522a
524
540
521a
521a
521a
550
520
551a
544

Fig. 8

METHOD AND APPARATUS FOR SUPPORTING A POLISHING PAD DURING CHEMICAL-MECHANICAL PLANARIZATION OF MICROELECTRONIC SUBSTRATES

TECHNICAL FIELD

[0001] The present invention is directed toward methods and apparatuses for supporting a polishing pad relative to a microelectronic substrate during mechanical and/or chemical-mechanical planarization.

BACKGROUND OF THE INVENTION

[0002] Mechanical and chemical-mechanical planarizing processes (collectively "CMP") are used in the manufacturing of microelectronic devices for forming a flat surface on semiconductor wafers, field emission displays, and many other microelectronic-device substrates and substrate assemblies. **FIG. 1** is a partially schematic isometric view of a conventional web-format planarizing machine **10** that has a platen **20**. A sub-pad **50** is attached to the platen **20** to provide a flat, solid workstation for supporting a portion of a web-format planarizing pad **40** in a planarizing zone "A" during planarization. The planarizing machine **10** also has a pad-advancing mechanism, including a plurality of rollers, to guide, position, and hold the web-format pad **40** over the sub-pad **50**. The pad-advancing mechanism generally includes a supply roller **24**, first and second idler rollers **21***a* and **21***b,* first and second guide rollers **22***a* and **22***b,* and a take-up roller **23**. As explained below, a motor (not shown) drives the take-up roller **23** to advance the pad **40** across the sub-pad **50** along a travel path T-T. The motor can also drive the supply roller **24**. The first idler roller **21***a* and the first guide roller **22***a* press an operative portion of the pad **40** against the sub-pad **50** to hold the pad **40** stationary during operation.

[0003] The planarizing machine **10** also has a carrier assembly **30** to translate a substrate **12** over the polishing pad **40**. In one embodiment, the carrier assembly **30** has a head **31** to pick up, hold and release the substrate **12** at appropriate stages of the planarizing process. The carrier assembly **30** also has a support gantry **34** and a drive assembly **35** that can move along the gantry **34**. The drive assembly **35** has an actuator **36**, a driveshaft **37** coupled to the actuator **36**, and an arm **38** projecting from the driveshaft **37**. The arm **38** carries the head **31** via a terminal shaft **39**. The actuator **36** orbits the head **31** about an axis B-B (as indicated by arrow R_1) and can rotate the head **31** (as indicated by arrow R_2) to move the substrate **12** over the polishing pad **40** while a planarizing fluid **43** flows from a plurality of nozzles **45** in the head **31**. The planarizing fluid **43** may be a conventional CMP slurry with abrasive particles and chemicals that etch and/or oxidize the substrate **12**, or the planarizing fluid **43** may be a non-abrasive planarizing solution without abrasive particles. In most CMP applications, conventional CMP slurries are used on conventional polishing pads, and planarizing solutions without abrasive particles are used on fixed-abrasive polishing pads.

[0004] In the operation of the planarizing machine **10**, the polishing pad **40** moves across the sub-pad **50** along the travel path T-T either during or between planarizing cycles to change the particular portion of the polishing pad **40** in the planarizing zone A. For example, the supply and take-up rollers **24**, **23** can drive the polishing pad **40** between planarizing cycles such that a point P moves incrementally across the sub-pad **50** to a number of intermediate locations I_1, I_2, etc. Alternatively, the rollers **24**, **23** may drive the polishing pad **40** between planarizing cycles such that the point P moves all the way across the sub-pad **50** to completely remove a used portion of the polishing pad **40** from the planarizing zone A. The rollers **24**, **23** may also continuously drive the polishing pad **40** at a slow rate during a planarizing cycle such that the point P moves continuously across the sub-pad **50** during planarization. In any case, the motion of the polishing pad **40** is generally relatively slow when the substrate **12** engages the polishing pad **40** and the relative motion between the substrate **12** and the polishing pad **40** is primarily due to the motion of the head **31**.

[0005] One drawback with the apparatus shown in **FIG. 1** is that debris can become caught between the polishing pad **40** and the sub-pad **50**. The debris can cause a local bump or other non-uniformity in the polishing pad **40** which can create a corresponding non-uniformity in the substrate **12** and/or can cause the polishing pad **40** to wear in a non-uniform manner.

[0006] A further drawback is that the polishing pad **40** can adhere to the sub-pad **50** during planarization. This adhesive bond must be broken in order to advance the polishing pad **40**. In one conventional method, the idler rollers **21***a,* **21***b* and/or the guide roller **22***a* are actuated to move the polishing pad **40** normal to the upper surface of the sub-pad **50** and break the adhesive bond. However, moving the polishing pad **40** normal to the sub-pad **50** can flex the polishing pad **40** and cause cracks, pits, and other defects to form in the polishing pad **40**, which can in turn create non-uniformities in the planarized surface of the substrate **12**.

[0007] Another drawback is that the polishing pad **40** and the sub-pad **50** can wear or abrade as they rub against each other. Accordingly, the polishing pad **40** and the sub-pad **50** may need to be replaced on a frequent basis and/or the polishing pad **40** may develop non-uniformities.

[0008] One conventional CMP apparatus which may address some of the foregoing drawbacks includes a polishing pad that forms a continuous loop and that moves a high speed relative to the substrate, in the manner of a belt sander. **FIG. 2** is a partially schematic side elevation view of one such conventional CMP apparatus **10***a* having a continuous polishing pad **40***a* extending around two rollers **25**. The polishing pad **40***a* can be supported by a continuous support band **41**, formed from a flexible material, such as a thin sheet of stainless steel. A pair of platens **20***a* provide additional support for the polishing pad **40***a* at two opposing planarizing stations. Two carriers **30***a,* each aligned with one of the platens **20***a* can each bias a substrate **12** against opposing outwardly-facing portions of a planarizing surface **42***a* of the polishing pad **40***a.* Devices such as the apparatus **10***a* shown in **FIG. 2** and having vertically oriented planarizing stations are available from Aplex, Inc. of Sunnyvale, Calif. under the name AVERA™. Generally similar devices having a horizontally-oriented polishing pad **40***a* and a single carrier **30***a* are available from Lam Research Corporation of Fremont, Calif.

[0009] During operation, the continuous polishing pad **40***a* moves at a relatively high speed around the rollers **25** while the carriers **30***a* press the substrates **12** against the polishing pad **40***a*. An abrasive slurry is introduced to the planarizing surface **42***a* of the polishing pad **40***a* so that the slurry, in combination with the motion of the polishing pad **40***a* relative to the substrates **12**, mechanically removes material from the substrates **12**.

[**0010**] One drawback with the apparatus **10***a* shown in **FIG. 2** is that the polishing pad **40***a* must move at a high speed to effectively planarize the substrates **12**. The high-speed polishing pad **40***a* can present a safety hazard to personnel positioned nearby, for example, if the polishing pad **40***a* should break, loosen, or otherwise malfunction during operation.

[**0011**] Another drawback is that the combination of the polishing pad **40***a* and the support band **41** may also wear more quickly than other polishing pads because both the planarizing surface **42***a* of the polishing pad **40***a* and a rear surface **44** of the support band **41** rub against relatively hard surfaces (i.e., the polishing pad **40***a* rubs against the substrate **12** and the support band **41** rubs against the platen **20***a*). This drawback can be serious because, once a defect forms in the polishing pad **40***a*, it can affect each subsequent substrate **12**.

[**0012**] Still another drawback is that the interface between the support band **41** and the platens **20***a* can be difficult to seal, due to the high speed of the support band **41**. Accordingly, the abrasive slurry can seep between and abrade the support band **41** and the platens **20***a*.

SUMMARY OF THE INVENTION

[**0013**] The present invention is directed to methods and apparatuses for planarizing microelectronic substrates. In one aspect of the invention, the apparatus can include a platen that supports a movable support pad which in turn supports a polishing pad against which the substrate is pressed to remove material from the substrate. The polishing pad can be an elongated web-format type pad that moves across the platen between or during planarizing cycles. The support pad can move at approximately the same rate as the polishing pad, reducing or eliminating relative motion between the two when they are in contact with each other and aligned with the platen.

[**0014**] In one aspect of the invention, the apparatus can include cleaning and/or milling devices to treat the surfaces of the polishing pad and/or the support pad before they engage each other. The support pad can be a continuous loop or can extend from a supply roller to a take-up roller. The platen can also be in the form of a continuous loop or an elongated member that extends from a supply roller to a take-up roller and can be integrated with the support pad in a further aspect of the invention. The platen can be supported by rollers, fluid jets, or a pressurized bladder, and in yet a further aspect of the invention, can include orifices for directing fluid against the support pad to further reduce the likelihood for abrasive contact between the support pad and the platen.

[**0015**] In a method in accordance with an aspect of the invention, at least part of the support pad can be positioned between the platen and the polishing pad of a planarizing machine. The polishing pad can be moved at a first rate to move a first portion of the polishing pad into alignment with the platen while moving a second portion of the polishing pad out of alignment with the platen. The support pad can be moved at a second rate approximately the same as the first rate to engage a first portion of the support pad with the first portion of the polishing pad and disengage a second portion of the support pad from the second portion of the polishing pad. In one aspect of the invention, the platen can be movable along with the support pad and can be tensioned by directing a flow of fluid toward the platen, biasing a roller against the platen or pressing a bladder against the platen.

BRIEF DESCRIPTION OF THE DRAWINGS

[**0016**] **FIG. 1** is a partially schematic, front isometric view of a web-format planarizing machine in accordance with the prior art.

[**0017**] **FIG. 2** is a partially schematic, side elevation view of a planarizing machine having a continuous polishing pad in accordance with the prior art.

[**0018**] **FIG. 3** is a partially schematic, side elevation view of a planarizing machine having a movable support pad in accordance with an embodiment of the invention.

[**0019**] **FIG. 4** is a partially schematic, side elevation view of a portion of the apparatus shown in **FIG. 3**.

[**0020**] **FIG. 5** is a partially schematic, side elevation view of a planarizing machine having a movable, non-continuous support pad in accordance with another embodiment of the invention.

[**0021**] **FIG. 6** is a partially schematic, side elevation view of a planarizing machine having a support pad coupled to a movable platen in accordance with yet another embodiment of the invention.

[**0022**] **FIG. 7** is a partially schematic, side elevation view of a planarizing machine having a segmented platen in accordance with still another embodiment of the invention.

[**0023**] **FIG. 8** is a partially schematic, partial cross-sectional side elevation view of a planarizing machine having a movable, non-continuous platen supported by a rotating bladder in accordance with another embodiment of the invention.

DETAILED DESCRIPTION OF THE INVENTION

[**0024**] The present invention is directed towards methods and apparatuses for planarizing microelectronic substrates and/or substrate assemblies. Many specific details of certain embodiments of the invention are set forth in the following description and in FIGS. **3**-**8** to provide a thorough understanding of such embodiments. One skilled in the art, however, will understand that the present invention may have additional embodiments, or that the invention may be practiced without several of the details described in the following description.

[**0025**] **FIG. 3** is a partially schematic, side elevation view of a planarizing machine **110** having a polishing pad **140** supported on a moving support pad **150**. The polishing pad **140** can extend from a supply roller **124** across a platen **120** to a take-up roller **123**, while being controlled and guided by two idler rollers **121***a*, **121***b* and two guide rollers **122***a*, **122***b*, generally as was discussed above. The polishing pad **140** can have a planarizing surface **142** facing toward a substrate or substrate assembly **112** and a back surface **141** facing opposite the planarizing surface **142**. A carrier assembly **130** positioned adjacent the polishing pad **140** can include a head **131** that biases the substrate **112** against the polishing pad **140** during operation. An actuator **135** can move the head **131** relative to the polishing pad **140** to remove material from the substrate **112**. The polishing pad **140** can advance from the supply roller **124** to the take-up roller **123** either between or during planarization cycles, in a manner generally similar to that discussed above.

[**0026**] The support pad **150** fits between the back surface **141** of the polishing pad **140** and a support surface **125** of the platen **120**, and can move with the polishing pad **140** across the platen **120**. For example, in one embodiment, the support pad **150** forms a continuous loop that extends around two support pad rollers **151** (shown as a left roller **151***a* and a right roller **151***b*) positioned on opposite sides of the platen **120**. An upper leg of the loop moves from left to right along with the polishing pad **140** (as indicated by arrow **145**) and a lower leg of the loop moves from right to left (as indicated by arrow **146**). In one aspect of this embodiment, the support pad rollers **151** are rotatable but unpowered, and the frictional force between the polishing pad **140** and the support pad **150** is sufficient to slide the support pad **140** over the platen **120** as the polishing pad **140** advances from the supply roller **124** to the take-up roller **123**. Alternatively, either or both of the support pad rollers **151** can be powered. In any case, the support pad **150** can move relative to the platen **120** at approximately the same rate as does the polishing pad **140** so that the portion of the support pad **150** between the polishing pad **140** and the platen **120** is generally fixed relative to the polishing pad **140**.

[**0027**] The apparatus **110** can include cleaning devices **170** and a milling device **180** that treat the polishing pad **140** and the support pad **150** before they come together on the platen **120**. Further details of the structure and operation of the cleaning devices **170**, the milling device **180** and the support pad **150** will be discussed below with reference to **FIG. 4**.

[**0028**] **FIG. 4** is a detailed side elevation view of a portion of the apparatus **110** shown in **FIG. 3**. As shown in **FIG. 4**, the support pad **150** can include a pad body **160** having a composite structure with an inner layer **152** facing toward the platen **120**, an outer layer **153** facing opposite the inner layer **152**, and a core **154** between the inner and outer layers **152**, **153**. In one embodiment, the inner and outer layers **152**, **153** can include a relatively rigid, incompressible material, such as fiberglass or Mylar®, and the core **154** can include a relatively flexible or compressible material, such as a gel or a foam, including, for example, a urethane foam. Alternatively, the pad body **160** can have a uniform composition that can include either a relatively compressible material or a relatively incompressible material. In any case, the support pad **150** can reduce the effect of contaminants on the uniformity of the planarizing surface **142**. For example, when the support pad **150** is at least partially compressible, it can flex to reduce the effect on the planarizing surface **142** of a contaminant trapped between the support pad **150** and the platen **120**. When the support pad **150** is more rigid, it can distribute the effect of the contaminant over a large area, which can also reduce the effect of the contaminant on the uniformity of the planarizing surface **142**.

[**0029**] The support pad **150** can reduce the effect of contaminants that might be positioned between the support pad **150** and the platen **120**, as discussed above. The cleaning devices **170** (shown as a fluid system **170***a* and a brush **170***b*) and the milling device **180** can reduce the likelihood for contaminants to become trapped between the support pad **150** and the polishing pad **140** by treating the surfaces of the polishing pad **140** and/or the support pad **150** before the two engage each other and pass over the platen **120**. For example, the fluid system **170***a* can include a manifold **171** having a plurality of apertures **173** (shown as an upward-facing aperture **173***a* facing toward the polishing pad **140** and a downward-facing aperture **173***b* facing toward the support pad **150**). The manifold **171** can be coupled with a conduit **172** to a fluid source (not shown), such as a source of liquid or gas. The fluid can be pumped through the manifold **171** and the orifices **173** to impinge on and wash contaminants from the polishing pad **140** and the support pad **150**. For example, the manifold **171** can be coupled to both a liquid source and a gas source to clean the polishing pad **140** and the support pad **150** with liquid and then dry the polishing pad **140** and the support pad **150** with the gas. Alternatively, the conduit **172** can be coupled to a vacuum source (not shown) for removing the contaminants under the force of a vacuum.

[**0030**] The brush **170***b* can include bristles **174** facing toward the polishing pad **140** and/or the support pad **150** to scrub contaminants therefrom. In one aspect of this embodiment, the brush **170***b* can be coupled to an actuator (not shown) to move the brush **170***b* into engagement with the polishing pad **140** and/or the support pad **150** during a cleaning cycle and out of engagement after the cleaning cycle is complete. In one embodiment, both the brush **170***b* and the fluid system **170***a* can be positioned adjacent the outer layer **153**. Alternatively, the brush **170***b* can include bristles **174** adjacent the inner layer **152** and the fluid system **170***a* can include orifices **173** directed toward the inner layer **152** for removing contaminants from the inner layer **152**.

[**0031**] The milling device **180** can include a head **181** having sharpened surfaces **183** for removing a layer of material from the support pad **150**. The head **181** can be coupled to an actuator **182** that moves the head **181** into and out of engagement with the support pad **150** and that rotates or otherwise moves the head **181** in the plane of the support pad **150** for removing material from the support pad **150**. In one aspect of this embodiment, the head **181** can be positioned adjacent to the outer layer **153** of the support pad **150** to form a smooth surface at the outer layer (for example, if the outer layer **153** becomes abraded during use). Alternatively, the head **181** can be positioned proximate to the inner layer **152** of the support pad **150** which may become abraded as a result of contact with the platen **120**. In another embodiment, one head **181** can be positioned adjacent the inner layer **152** and a second head **181** can be positioned adjacent the outer layer **153** to smooth both opposite facing surfaces of the support pad **150**.

[**0032**] In operation, the polishing pad **140** moves over the platen **120** from the supply roller **124** (**FIG. 3**) to the take-up roller **123** (**FIG. 3**), either between or during planarizing cycles. As the polishing pad **140** advances over the platen **120**, an incoming portion C of the polishing pad **140** moves into alignment with the platen **120** so that it is positioned directly opposite the support surface **125** of the platen **120**.

At the same time, an outgoing portion D of the polishing pad **140** moves out of alignment with the platen **120**. As the polishing pad **140** moves relative to the platen **120**, the support pad **150** moves at approximately the same rate so that an incoming portion E of the support pad **150** moves into alignment with the platen **120** between the platen **120** and the polishing pad **140,** and an outgoing portion F of the support pad **150** moves out of alignment with the platen **120**. The incoming portion E of the support pad **150** supports the incoming portion C of the polishing pad **140** relative to the platen **120** while the carrier assembly **130 (FIG. 3)** presses the substrate **112 (FIG. 3)** against the polishing pad **140**.

[**0033**] One feature of the apparatus **110** shown in **FIGS. 3 and 4** is that the support pad **150** moves together with the polishing pad **140** relative to the platen **120**. One advantage of this feature is that the polishing pad **140** will not wear as a result of relative motion with the support pad **150** because the two move together at approximately the same rate when they are in contact with each other. Any wear due to relative motion with the platen **120** is instead borne by the support pad **150,** which bears against the fixed platen **120**. Accordingly, the support pad **150** can include materials selected for abrasion resistance, or alternatively, the support pad **150** can include relatively inexpensive materials that may not be particularly wear-resistant, but are economical to replace.

[**0034**] Another advantage is that it is not necessary to move the guide rollers **122 (FIG. 3)** and/or the idler rollers **121 (FIG. 3)** normal to the polishing pad **140** to force the polishing pad **140** out of engagement with the support pad **150**. Instead, the polishing pad **140** and the support pad **150** separate from each other as the polishing pad **140** passes over the first guide roller **122***a* and the support pad **150** diverges and passes over the right roller **151***b*. The interfacing surfaces of the polishing pad **140** and the support pad **150** can diverge even if the interfacing surfaces are wet, so that the interfacing surfaces can be cleansed with a liquid without substantially affecting the manner in which the support pad **150** separates from the polishing pad **140**.

[**0035**] Yet another feature of the apparatus **110** is that the cleaning device **170** can reduce the likelihood for contaminants to become lodged between the polishing pad **140** and the support pad **150,** and the milling device **180** can increase the planarity of the support pad **150**. Accordingly, the polishing pad **140** and the support pad **150** can be less likely to develop bulges or other non-uniformities that reduce the planarity of the planarizing surface **142** and therefore the substrate **112**. Furthermore, should contaminants become trapped between the support pad **150** and the platen **120**, the effect of such contaminants on the planarizing surface **142** can be reduced (compared to the effect of a contaminant trapped between a polishing pad and a support pad, such as is shown in **FIG. 1**) because the support pad **150** can either flex to accommodate the contaminant or distribute the effect of the contaminant over a large area.

[**0036**] **FIG. 5** is a partially schematic, side elevation view of a planarizing apparatus **210** having a non-continuous support pad **250** that supports a polishing pad **240** in accordance with another embodiment of the invention. The polishing pad **240** can advance from a supply roller **224**, past idler rollers **221***a,* **221***b* and to a take-up roller **223** in a manner generally similar to that discussed above with reference to **FIGS. 3 and 4**. The support pad **250** is initially wound on a first roller **251***a* and extends across a platen **220** to a second roller **251***b*. Support pad idler rollers **255***a* and **255***b* can tension the support pad **250** against a support surface **225** of the platen **220**. Accordingly, the support pad **250** can unwind from the first roller **251***a* across the platen **220** and onto the second roller **251***b* in a manner generally similar to that discussed above with reference to the polishing pad **140** shown in **FIGS. 3 and 4**. In one aspect of this embodiment, the second roller **251***b* is powered to wind the support pad **250**. Alternatively, both the first and second rollers **251** can be powered. In either case, the roller(s) **251** can advance the support pad **250** across the platen **220** at approximately the same rate as the polishing pad **240** advances across the platen **220**.

[**0037**] In one embodiment, the support pad **250** can be disposed of once it is completely wound up on the second roller **251***b*. Alternatively, the support pad **250** can be rewound onto the first roller **251***a* and reused. In either case, the support pad **250** can have a length approximately the same as the length of the polishing pad **240** (in one embodiment), so that the polishing pad **240** and the support pad **250** become completely wound up on their respective rollers at approximately the same time. Accordingly, the polishing pad **240** and the support pad **250** can be changed or rewound at the same time.

[**0038**] In one embodiment, the platen **220** can include a manifold **226** having perforations or orifices **229** extending through the support surface **225** adjacent to the support pad **250**. The manifold **226** can be coupled with a conduit **227** to a source of pressurized liquid or gas **228**. In operation, the source **228** can supply liquid or gas to the manifold **226** and through the orifices **229** at a rate sufficient to separate at least a portion of the support pad **250** from the support surface **225**. Accordingly, the size and spacing of the orifices **227** and the pressure of the fluid from the source **228** can be selected to separate the support pad **250** from the support surface **225** by a selected amount. An advantage of this feature is that it can reduce the friction between the support pad **250** and the platen **220** as the support pad **250** advances across the platen **220**. In an alternate arrangement, suitable for an apparatus having a fixed support pad such as the one shown in **FIG. 1**, the support pad can have orifices aligned with the orifices of the manifold so that the pressurized liquid or gas can separate the polishing pad from the support pad.

[**0039**] Another feature of the apparatus **210** is that the non-continuous support pad **250** can include relatively inexpensive materials so that the support pad **250** can be economically replaced at the same time as the polishing pad **240**. Conversely, a feature of the continuous support pad **150** **(FIGS. 3 and 4)** is that it can last through several polishing pads **140** and/or several cycles of a single polishing pad **140**.

[**0040**] **FIG. 6** is a partially schematic, side elevation view of an apparatus **310** having a continuous support pad **350** integrated with a continuous platen **320** in accordance with another embodiment of the invention. The continuous support pad **350** can include materials generally similar to those discussed above with reference to **FIGS. 3 and 4** and can move into and out of engagement with a polishing pad **340** in a manner generally similar to that discussed above with reference to **FIGS. 3 and 4**. The platen **320** can include a continuous loop formed from a generally incompressible, relatively flexible material, such as a thin stainless steel sheet and can carry the support pad **350** over and around support pad rollers **351** (shown as a left support pad roller **351***a* and a right support pad roller **351***b*).

[**0041**] In one embodiment, the support pad **350** and the platen **320** can be tensioned over the support pad rollers **351** by a tensioning device, such as an idler roller **355** that presses upwardly against the lower leg of the loop formed by the support pad **350** and the platen **320**. Alternatively, other devices can provide a flat surface that supports the polishing pad **340**. For example, in one embodiment, the apparatus **310** can include a manifold **311** having a plurality of jet orifices **315** directed upwardly toward a back side **326** of the upper leg of the loop. The manifold **311** can be coupled to a conduit **316**, which is in turn coupled to a source of pressurized fluid, such as pressurized water or pressurized air which is forced through the orifices **315** to tension the platen **320** and the support pad **350**. Alternatively, the manifold **311** can be positioned adjacent the lower leg of the loop (at approximately the location of the idler roller **355**) with the jet orifices **315** directed upwardly against the lower leg in addition to or in lieu of the idler roller **355**. An advantage of tensioning the lower leg is that the upper leg is less likely to bow upwardly.

[**0042**] One feature of the apparatus **310** shown in **FIG. 6** is that it eliminates relative motion between the support pad **350** and the platen **320**. Accordingly, an advantage of the apparatus **310** is that it can reduce the wear on the support pad **350**, which can increase the life of the support pad **350** and reduce the frequency with which the support pad **350** may need to be replaced. A further advantage is that by integrating the support pad **350** with the platen **320**, the apparatus **310** can eliminate the possibility for contaminants to become caught between the support pad **350** and the platen **320**, further reducing the likelihood that contaminants can reduce the planarity of the polishing pad **340**.

[**0043**] **FIG. 7** is a partially schematic, side elevation view of an apparatus **410** having a segmented platen **420** connected to a support pad **450**, both of which support a polishing pad **440** in accordance with another embodiment of the invention. The platen **420** can include a plurality of links **427** pivotally coupled to each other with pins **428** to form a continuous loop extending around two rollers **451** (shown as a left roller **451***a* and a right roller **451***b*) generally in the manner of a chain or tank trend. In one aspect of this embodiment, the rollers **451** can each include teeth **456** to engage the links **427** and align the links **427** as they pass over the rollers **451**. Alternatively, the platen **420** can include other segmented arrangements and the roller can include other corresponding features for guiding the platen **420**.

[**0044**] In one embodiment, the apparatus **410** can also include a plurality of support rollers **458** positioned between the rollers **451** along the upper leg of the loop formed by the platen **420** and support pad **450** to support the platen **420** and the support pad **450** in the region between the rollers **451**. An idler roller **455** can be positioned adjacent the lower leg of the loop to bias the platen **420** and the support pad **450** upwardly and tension these components relative to the rollers **451**, either in addition to or in lieu of the support rollers **458**.

[**0045**] In one embodiment, the support pad **450** can include a plurality of segments **457**, each separately attached to one of the links **427**. The segments **457** can be closely spaced to provide a nearly continuous support surface for the polishing pad **440**. Alternatively, the support pad **450** can be continuous, for example, by making the connection between the support pad **450** and the links **427** flexible and/or making the support pad **450** itself flexible, so that the support pad **450** can bend around the rollers **451**. In yet another alternate embodiment, both the polishing pad **440** and the support pad **450** can be elongated, non-continuous pads that extend between corresponding supply rollers and take-up rollers, generally as discussed above with reference to **FIG. 5**. Accordingly, the support pad **450** can be removed and/or replaced without removing the platen **420**. In any case, the support pad **450** can engage with and disengage from the polishing pad **440** (which unwinds from a supply roll **424** and winds up onto a take-up roller **423**) in a manner generally similar to that discussed above with reference to **FIGS. 3 and 4**.

[**0046**] **FIG. 8** is a partially schematic, partial cross-sectional side elevation view of a planarizing machine **510** having a movable, non-continuous platen **520** supported by a rotating bladder **590** in accordance with another embodiment of the invention. The bladder **590** can be formed from an at least partially fluid tight membrane folded upon itself to define an interior region **594** filled with a fluid, such as water or air. The bladder **590** has a cross-sectional shape that forms a loop having an upper leg **591** adjacent the platen **520** and a lower leg **592** opposite the upper leg **591**. The upper leg **591** can support the platen **520** and can move from left to right as indicated by arrow **545** along with the platen **520** as the platen **520** unwinds from a supply roller **544** to a take-up roller **543**. The lower leg **592** of the bladder **590** can move from right to left as indicated by arrow **546** and can be supported by a plurality of bladder rollers **593** that rotatably engage the lower leg **592**. Accordingly, the bladder **590** can bias the platen **520** to a flat position while minimizing abrasive contact between the platen **520** and the bladder **590** because the two move at the same rate when they are in contact with each other.

[**0047**] In one embodiment, the apparatus **510** can further include a non-continuous support pad **550** that unwinds from a supply roller **551***a* and winds up onto a take-up roller **551***b*. The apparatus **510** can further include a non-continuous polishing pad **540** that extends from a supply roller **524** to a take-up roller **523**. The platen **520**, the support pad **550** and the polishing pad **540** can each pass over separate left idler rollers **521***a* and right idler rollers **521***b* and can come together over a left guide roller **522***a* before passing over the bladder **590**. After passing over the bladder **590**, the platen **520**, the support pad **550** and the polishing pad **540** can pass over a right guide roller **522***b*, from which the platen **520**, the support pad **550** and the polishing pad **540** diverge.

[**0048**] In an alternate arrangement, the platen **520** can form a continuous loop that extends annularly around the bladder **590**. In a further aspect of this embodiment, the support pad **550** can be integrated with the platen **520**, in a manner similar to that discussed above with reference to FIGS. **6** or **7**. In any case, one feature of the apparatus **510** is that the polishing pad **540**, the support pad **550**, the platen **520**, and the bladder **590** each move at approximately the same linear rate when they are in contact with each other. Accordingly, the likelihood for abrasion between these components (which can reduce the expected service life of the components), can be significantly reduced in comparison to some conventional devices.

[0049] The apparatus **510** can also include a cleaning device (such as the devices **170** discussed above with reference to **FIG. 4**) and/or a milling device (such as the device **180** discussed above with reference to **FIG. 4**) positioned between the polishing pad **540** and the support pad **550**, the support pad **550** and the platen **520**, and/or the platen **520** and the bladder **590**. Accordingly, another feature of the arrangement shown in **FIG. 8** is that the likelihood for contaminants to become caught between the polishing pad **540**, the support pad **550** and/or the platen **520** can be reduced in comparison to some to conventional devices, reducing the likelihood for creating non-uniformities at the planarizing surface **542** and at the surface of the substrate **112**.

[0050] From the foregoing it will be appreciated that, although specific embodiments of the invention have been described herein for purposes of illustration, various modifications may be made without deviating from the spirit and scope of the invention. For example, certain features shown in the context of one embodiment of the invention may be incorporated in other embodiments as well. For instance, the cleaning devices **170** and the milling device **180** shown in **FIG. 4** may be used in connection with any of the planarizing machines shown in FIGS. **5-8**. The perforated platen **220** shown in **FIG. 5** can be used in conjunction with the support pad **150** and polishing pad **140** shown in **FIGS. 3 and 4**. Any of the platen tensioning arrangements shown in FIGS. **6-8** can be used with any of the flexible or segmented platens shown in these Figures to provide a flat support surface. Accordingly, the invention is not limited except as by the appended claims.

1. An apparatus for planarizing a microelectronic substrate, comprising:

a platen having a support surface;

an elongated polishing pad moveable relative to at least a portion of the platen between a first position with a portion of the polishing pad aligned with and facing toward at least a portion of the support surface of the platen and a second position with the portion of the polishing pad out of alignment and facing at least partially away from the support surface of the platen; and

an elongated support pad movable with the polishing pad between a first position with a portion of the support pad in contact with the portion of the polishing pad and a second position with the portion of the support pad out of contact with the portion of the polishing pad.

2. The apparatus of claim 1 wherein the support pad is elongated along an axis and is compressible in a direction generally perpendicular to the axis.

3. The apparatus of claim 1 wherein the polishing pad extends between a supply roll and a take-up roll.

4. The apparatus of claim 1, further comprising a first roller positioned proximate to the platen and a second roller spaced apart from the first roller, wherein the support pad forms a continuous loop extending around the first and second rollers.

5. The apparatus of claim 1, further comprising a pad supply roller and a pad take-up roller spaced apart from the pad supply roller, wherein the support pad is elongated between a first end coupled to the pad supply roller and a second end coupled to the pad take-up roll.

6. The apparatus of claim 1 wherein the platen includes an elongated flexible member attached to the support pad and movable with the support pad.

7. The apparatus of claim 1 wherein the platen is movable relative to the support pad between a first position with a portion of the platen in contact with the support pad and a second position with the portion of the platen separated from the support pad.

8. The apparatus of claim 7, further comprising a platen supply roller and a platen take-up roller spaced apart from the platen supply roller, wherein the platen is elongated between a first end coupled to the platen supply roller and a second end coupled to the platen take-up roller.

9. The apparatus of claim 7 wherein the platen includes a plurality of links pivotably coupled together to form a continuous loop, further wherein the support pad includes a plurality of adjacent separable support pad portions, each support pad portion being attached to one of the links of the platen.

10. The apparatus of claim 9, further comprising a plurality of rollers rotatably engaged with the links of the platen for supporting the platen and the support pad.

11. The apparatus of claim 7, further comprising:

an at least partially fluid tight bladder having a cross-sectional shape that defines a loop with a first portion and a second portion, the first portion of the loop being in contact with and supporting the platen; and

a plurality of rollers rotatably engaged with the second portion of the loop.

12. The apparatus of claim 1, further comprising a cleaning device positioned proximate to an interface between the portion of the polishing pad and the portion of the support pad to remove material from at least one of the polishing pad and the support pad.

13. The apparatus of claim 12 wherein the cleaning device is selected from a source of pressurized gas, a source of pressurized liquid, a vacuum source and a brush.

14. The apparatus of claim 12 wherein the support pad has a first surface and a second surface facing opposite the first surface, further wherein the cleaning device is positioned adjacent both surfaces of the support pad for cleaning the one surface.

15. The apparatus of claim 1, further comprising a milling device positioned proximate to the support pad and having at least one sharpened engaging surface positioned to remove a selected amount of support pad material from the support pad.

16. The apparatus of claim 14 wherein the support pad has a first surface and a second surface facing opposite the first surface, further wherein the milling device is positioned to remove material from both the first and second surfaces of the support pad.

17. The apparatus of claim 1 wherein the polishing pad is coupled to an actuator to move at a selected rate between the first position and the second position, further wherein the support pad is engaged with the polishing pad to move with the polishing pad at the selected rate.

18. The apparatus of claim 1 wherein the support surface of the platen has a plurality of orifices coupleable to a source of pressurized fluid for introducing the fluid between the support surface and the support pad to at least partially separate the support pad from the support surface.

19. An apparatus for planarizing a microelectronic substrate, comprising:

a platen having a support surface;

an elongated polishing pad moveable relative to at least a portion of the platen to move a first portion of the polishing pad into alignment with the support surface of the platen and move a second portion of the polishing pad spaced apart from the first portion out of alignment with the support surface of the platen; and

a support pad positioned partially between the polishing pad and the platen, the support pad being movable with the polishing pad and having a first portion in contact with the first portion of the polishing pad when the first portion of the polishing pad is aligned with the platen, the support pad further having a second portion out of contact with the polishing pad when the second portion of the polishing pad is out of alignment with the platen.

20. The apparatus of claim 19 wherein the polishing pad extends between a supply roller and a take-up roller.

21. The apparatus of claim 19, further comprising a first roller positioned proximate to the platen and a second roller spaced apart from the first roller, wherein the support pad forms a continuous loop extending around the first and second rollers.

22. The apparatus of claim 19, further comprising a pad supply roller and a pad take-up roller spaced apart from the pad supply roller, wherein the support pad is elongated between a first end coupled to the pad supply roller and a second end coupled to the pad take-up roller.

23. The apparatus of claim 19 wherein the platen is movable relative to the support pad between a first position with a portion of the platen in contact with the support pad and a second position with the portion of the platen separated from the support pad.

24. The apparatus of claim 19 wherein the platen includes an elongated flexible member attached to the support pad and movable with the support pad.

25. The apparatus of claim 19 wherein the platen includes a plurality of links coupled together to form a continuous loop, further wherein the support pad includes an elongated flexible member attached to the links of the platen.

26. The apparatus of claim 25, further comprising a plurality of rollers rotatably engaged with the segmented links of the platen for supporting the platen and the support pad.

27. The apparatus of claim 19, further comprising a cleaning device positioned adjacent an interface of the first portion of the polishing pad and the first portion of the support pad to remove material from at least one of the polishing pad and the support pad.

28. The apparatus of claim 27 wherein the cleaning device is selected from a source of pressurized gas, a source of pressurized liquid, a vacuum source and a brush.

29. The apparatus of claim 19, further comprising a milling device positioned proximate to the support pad and having at least one sharpened engaging surface positioned to remove a selected amount of material from the support pad.

30. The apparatus of claim 19 wherein the polishing pad is coupled to an actuator to move at a selected rate relative to the portion of the platen, further wherein the support pad is engaged with the polishing pad to move with the polishing pad at the selected rate.

31. The apparatus of claim 19 wherein the support surface of the platen has a plurality of orifices coupleable to a source of pressurized fluid for introducing the fluid between the support surface and the support pad to at least partially separate the support pad from the support surface.

32. A support pad for supporting a polishing pad of a web-format planarizing apparatus relative to a microelectronic substrate during planarization of the microelectronic substrates, the support pad comprising an elongated movable pad body having a first surface facing toward the polishing pad when the support pad is installed on the planarizing apparatus and a second surface facing opposite the first surface, the first surface including a first portion contacting the polishing pad and a second portion spaced apart from the polishing pad when the support pad is installed on the planarizing apparatus and the polishing pad moves relative to the support pad.

33. The support pad of claim 32 wherein the pad body defines a continuous loop and is configured to be engaged by at least two rollers for moving the pad body in a continuous path between the rollers.

34. The support pad of claim 32 wherein the pad body is elongated between a first end and a second end spaced apart from the first end, the first end being coupleable to a supply roller and the second end being coupleable to a take-up roller.

35. The support pad of claim 32, further comprising a platen attached to the pad body, the platen being generally incompressible in a direction generally perpendicular to at least one of the first and second surfaces of the pad body.

36. The support pad of claim 35 wherein the platen includes an elongated flexible sheet.

37. The support pad of claim 35 wherein the pad body is elongated along an axis and the platen includes a plurality of linked and generally rigid elements pivotably coupled to each other to bend with the pad body as the pad body flexes in a direction generally perpendicular to the axis.

38. The support pad of claim 32 wherein the pad body includes at least one of fiberglass, polycarbonate, urethane and a gel.

39. The support pad of claim 32 wherein the pad body includes a generally compressible core positioned between two generally incompressible facing layers.

40. An apparatus for supporting a polishing pad during planarization of a microelectronic substrate, comprising:

an elongated at least partially compressible support pad having a first surface for engaging the polishing pad and a second surface opposite the first surface; and

a platen attached to the second surface of the support pad, the platen being generally incompressible in a direction generally perpendicular to the second surface of the support pad, at least a portion of the platen and the support pad being movable with the polishing pad when the first surface of the support pad engages the polishing pad.

41. The apparatus of claim 40 wherein the support pad and the platen together form a continuous loop with the first surface of the support pad facing outward.

42. The apparatus of claim 40 wherein the support pad is elongated between a first end and a second end, the platen is elongated between a first end and a second end, the first ends of the platen and the support pad are adjacent to each other and the second ends of the platen and the support pads are adjacent to each other.

43. The apparatus of claim 40 wherein the platen includes a plurality of links pivotably coupled together to form a continuous flexible loop, further wherein the support pad is attached to the links of the platen.

44. The apparatus of claim 40 wherein the support pad includes at least one of fiberglass, polycarbonate, urethane and a gel.

45. An apparatus for supporting a polishing pad during planarization of a microelectronic substrate, comprising:

an elongated movable platen having a support surface for supporting the polishing pad, the platen being movable relative to the polishing pad between a first position and a second position when the polishing pad is positioned proximate to the platen, a portion of the support surface being aligned with and facing toward at least a portion of the polishing pad when the platen is in the first position, the portion of the support surface being out of alignment and facing at least partially away from the polishing pad when the platen is in the second position; and

a tensioning device positioned proximate to the movable platen and operatively coupled to the platen to bias the portion of the support surface aligned with and facing toward at least a portion of the polishing pad toward a generally flat orientation.

46. The apparatus of claim 45 wherein the platen defines a continuous loop extending around a first roller and a second roller.

47. The apparatus of claim 45 wherein the platen includes a plurality of links pivotably coupled together to form the loop.

48. The apparatus of claim 45 wherein the platen is elongated between a first end coupled to a supply roller and a second end coupled to a take-up roller.

49. The apparatus of claim 45 wherein the tensioning device includes a manifold coupled to a source of pressurized fluid, the manifold being in fluid communication with a plurality of orifices adjacent the platen.

50. The apparatus of claim 45 wherein the tensioning device includes at least one tensioning roller pressing against the platen and movable relative to the platen to bias the platen toward the generally flat orientation.

51. The apparatus of claim 45 wherein the tensioning device includes:

a bladder having a first surface portion pressing against the platen and movable with the platen in a first direction and a second surface portion opposite the first surface portion and movable in a second direction opposite the first direction; and

a plurality of rollers adjacent the second surface portion of the bladder, the rollers rotatably engaging the second surface portion of the bladder and rotatable relative to the second surface of the bladder as the second surface portion of the bladder moves in the second direction.

52. The apparatus of claim 51 wherein the bladder contains a pressurized fluid.

53. The apparatus of claim 45, further comprising a support pad positioned between the support surface of the platen and the polishing pad to space the support surface away from the polishing pad while the support surface supports the polishing pad.

54. The apparatus of claim 45 wherein the platen includes a generally flexible, incompressible sheet.

55. An apparatus for supporting a polishing pad during planarization of a microelectronic substrate, comprising:

a platen having a support surface with a plurality of orifices, the orifices being in fluid communication with a source of pressurized fluid for directing the fluid through the orifices and away from the platen; and

an elongated support pad adjacent to the support surface of the platen, the support pad having a first surface facing away from the platen for engaging the polishing pad and a second surface facing toward the platen, at least a portion of the second surface of the support pad being separated from the support surface of the platen when the pressurized fluid passes through the orifices away from the platen.

56. The apparatus of claim 55 wherein the support pad is moveable relative to the platen between a first position with a portion of the support pad in contact with a portion of the polishing pad and a second position with the portion of the support pad out of contact with the polishing pad.

57. The apparatus of claim 55, further comprising a pad supply roller and a pad take-up roller, wherein the support pad is elongated between a first end coupled to the pad supply roller and a second end coupled to the pad take-up roller.

58. The apparatus of claim 55, further comprising a first roller positioned proximate to the platen and a second roller spaced apart from the first roller, wherein the support pad forms a continuous loop extending around the first and second rollers.

59. The apparatus of claim 55 wherein the orifices are in fluid communication with a source of pressurized liquid.

60. The apparatus of claim 55 wherein the orifices are in fluid communication with a source of pressurized gas.

61. A method for supporting a polishing pad of a planarizing machine during planarization of a microelectronic substrate, the method comprising:

positioning at least part of a support pad between a platen of the planarizing machine and the polishing pad;

moving the polishing pad at a first rate to move a first portion of the polishing pad into alignment with the platen while moving a second portion of the polishing pad out of alignment with the platen; and

moving the support pad at a second rate approximately the same as the first rate to engage a first portion of the support pad with the first portion of the polishing pad and disengage a second portion of the support pad from the polishing pad.

62. The method of claim 61 wherein moving the polishing pad includes unrolling the polishing pad from a supply roll and rolling the polishing pad up on take-up roll.

63. The method of claim 61 wherein the support pad forms a continuous loop and moving the support pad includes rolling the support pad continuously between a first roller and a second roller spaced apart from the first roller.

64. The method of claim 61 wherein moving the support pad includes unrolling the support pad from a pad supply roll and rolling the support pad up on a take-up roll.

65. The method of claim 61 wherein the support pad is attached to the platen and moving the support pad includes moving the platen.

66. The method of claim 61 wherein the platen is movable relative to the support pad, further comprising moving the platen relative to the support pad between a first position with a portion of the platen contacting the support pad and a second position with the portion of the platen separated from the support pad.

67. The method of claim 66 wherein the platen includes a plurality of segmented links coupled together to form a continuous loop, further wherein moving the platen includes wrapping the plurality of links around at least two rollers and rolling the loop back and forth between the rollers.

68. The method of claim 66 wherein moving the platen includes unrolling the platen from a supply roller and rolling the platen up on a take-up roller.

69. The method of claim 61, further comprising cleaning at least one of the polishing pad and the first portion of the support pad before moving the first portion of the polishing pad into alignment with the platen.

70. The method of claim 61 wherein cleaning at least one of the polishing pad and the first portion of the support pad includes exposing the at least one of the polishing pad and the support pad to a source of pressurized gas, a source of pressurized liquid, a vacuum source and a brush.

71. The method of claim 61, further comprising removing a selected amount of material from the support pad.

72. The method of claim 61 wherein moving a first portion of the polishing pad into alignment with the platen includes positioning the polishing pad proximate to the platen with a planarizing surface of the polishing pad generally parallel to the platen.

73. The method of claim 61 wherein moving the polishing pad includes rolling the polishing pad on a take-up roll and moving the support pad includes frictionally engaging the support pad with the polishing pad so that the support pad moves with the polishing pad.

74. The method of claim 61, further comprising separating at least a portion of the support pad from the platen by directing a fluid toward the support pad through a plurality of orifices in the platen.

75. A method for supporting a polishing pad during planarization of a microelectronic substrate, comprising:

engaging a support pad with the polishing pad;

positioning at least a portion of the support pad between the polishing pad and a platen;

moving the polishing pad and the portion of the support pad at the same rate relative to the platen.

76. The method of claim 75 wherein moving the polishing pad includes moving a first portion of the polishing pad into engagement with the support pad and moving a second portion of the polishing pad spaced apart from the first portion of the polishing pad out of engagement with the support pad.

77. The method of claim 75 wherein moving the polishing pad and the portion of the support pad at the same rate includes frictionally engaging the polishing pad with the portion of the support pad so that the support pad moves with the polishing pad.

78. The method of claim 75 wherein moving the polishing pad includes unrolling the polishing pad from a supply roll and rolling the polishing pad up on take-up roll.

79. The method of claim 75 wherein the support pad forms a continuous loop, further comprising moving the support pad by rolling the support pad continuously between a first roller and a second roller spaced apart from the first roller.

80. The method of claim 75 wherein moving the support pad includes unrolling the support pad from a pad supply roll and rolling the support pad up on a take-up roll.

81. The method of claim 75, further comprising cleaning at least one of the polishing pad and the first portion of the support pad before positioning a portion of the support pad between the polishing pad and the platen.

82. The method of claim 75 wherein cleaning at least one of the polishing pad and the first portion of the support pad exposing the at least one of the polishing pad and the support pad to a source of pressurized gas, a source of pressurized liquid, a vacuum source and a brush.

83. The method of claim 75, further comprising removing a selected amount of support pad material from the support pad.

84. A method for supporting a polishing pad on a platen of a planarizing machine, comprising:

inserting a portion of a support pad between a portion of the polishing pad and a first portion of the platen;

moving the portion of the polishing pad, the first portion of the platen and the portion of the support pad together relative to a second portion of the platen;

separating the portion of the polishing pad from the portion of the support pad.

85. The method of claim 84 wherein moving the portion of the polishing pad includes unrolling the polishing pad from a supply roll and rolling the polishing pad up on take-up roll.

86. The method of claim 84 wherein the support pad forms a continuous loop at least partially wrapped around first and second spaced apart rollers and moving the portion of the support pad includes rolling the support pad continuously between the first and second rollers.

87. The method of claim 84 wherein moving the support pad includes unrolling the support pad from a support pad supply roll and rolling the support pad up on a support pad take-up roll.

88. The method of claim 84 wherein the platen includes a plurality of links coupled together to form a continuous loop, further wherein moving the platen includes wrapping the plurality of links around at least two rollers and rotating at least one of the rollers to move the loop back and forth between the rollers.

89. The method of claim 84, further comprising cleaning at least one of the polishing pad and the first portion of the support pad before moving the first portion of the polishing pad into alignment with the platen.

90. The method of claim 84 wherein cleaning at least one of the polishing pad and the first portion of the support pad exposing the at least one of the polishing pad and the support pad to a source of pressurized gas, a source of pressurized liquid, a vacuum source and a brush.

91. The method of claim 84, further comprising removing a selected amount of material from the support pad.

92. The method of claim 84 wherein moving a first portion of the polishing pad into alignment with the platen includes positioning the polishing pad proximate to the platen with a planarizing surface of the polishing pad generally parallel to the platen.

93. A method for supporting a polishing pad of a planarizing machine, comprising:

providing a flexible platen having a support surface for supporting the polishing pad;

tensioning the platen to at least approximately flatten the support surface; and

moving the platen between a first position with the support surface aligned with and facing toward the polishing pad and a second position with the support surface out of alignment and facing at least partially away from the polishing pad.

94. The method of claim 93, further comprising inserting a support pad between the support surface of the platen and the polishing pad.

95. The method of claim 93 wherein tensioning the platen includes directing a flow of fluid toward the platen.

96. The method of claim 93 wherein tensioning the platen includes biasing a roller against the platen.

97. The method of claim 93 wherein tensioning the platen includes pressing a first surface portion of a bladder against the platen, biasing a plurality of rollers against a second surface portion of the bladder and rotating the bladder as the platen moves between the first position and the second position such that the first surface portion of the bladder moves with the platen and the second surface portion of the bladder rotates the rollers.

98. The method of claim 93 wherein the platen forms a continuous loop having a first portion proximate to the polishing pad and a second portion spaced apart from the first portion, further wherein tensioning the platen includes directing a tensioning force to the first portion of the platen.

99. The method of claim 93 wherein the platen forms a continuous loop having a first portion proximate to the polishing pad and a second portion spaced apart from the first portion, further wherein tensioning the platen includes directing a tensioning force to the second portion of the platen.

100. A method for supporting a polishing pad during planarization of a microelectronic substrate, comprising:

positioning a support pad proximate to a platen such that a first surface of the support pad faces the support surface of the platen and a second surface of the support pad faces away from the platen;

positioning the polishing pad adjacent the second surface of the support pad; and

supplying pressurized fluid through orifices of the platen to separate a portion of the support pad from the support surface of the platen.

101. The method of claim 100 wherein supplying a pressurized fluid includes supplying a pressurized liquid.

102. The method of claim 100 wherein supplying a pressurized fluid includes supplying a pressurized gas.

103. The method of claim 101, further comprising advancing the support pad and the polishing pad over the platen at approximately the same rate.

104. The method of claim 103 wherein advancing the support pad includes unrolling the support pad from a supply roller and rolling the support pad onto a take-up roller.

105. The method of claim 103 wherein advancing the support pad includes rolling the support pad in a continuous loop between first and second spaced apart rollers.

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