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(54) **ELECTRICAL CLEANING TOOL FOR WAFER POLISHING TOOL SYSTEM**

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(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 96 days.

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(22) Filed: **Aug. 15, 2022**

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US 2024/0050995 A1 Feb. 15, 2024

(51) **Int. Cl.**

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B08B 1/12	(2024.01)
B24B 37/04	(2012.01)
B24B 37/10	(2012.01)
B24B 37/30	(2012.01)
B24B 57/02	(2006.01)

(52) **U.S. Cl.**
CPC ***B08B 3/10*** (2013.01); ***B08B 1/12*** (2024.01); ***B24B 37/044*** (2013.01); ***B24B 37/046*** (2013.01); ***B24B 37/105*** (2013.01); ***B24B 37/30*** (2013.01); ***B24B 57/02*** (2013.01)

(58) **Field of Classification Search**
None
See application file for complete search history.

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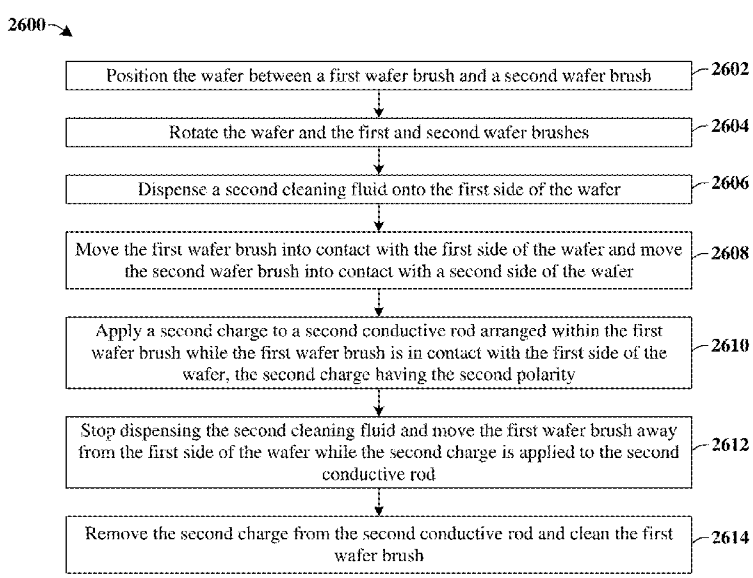
(74) *Attorney, Agent, or Firm* — Eschweiler & Potashnik, LLC

(57) **ABSTRACT**

A method comprising: providing a slurry to a polishing pad that is disposed on a wafer platen, the slurry comprising a plurality of electrically charged abrasive particles having a first electrical polarity; moving a first side of a wafer into contact with the slurry and the polishing pad;
applying a first electrical charge having a second electrical polarity, opposite the first electrical polarity, to a first conductive rod; moving the first side of the wafer away from the polishing pad while the first electrical charge is applied to the first conductive rod; moving a first wafer brush into contact with the first side of the wafer; applying a second electrical charge having the second electrical polarity, opposite the first electrical polarity, to a second conductive rod arranged within the first wafer brush; and moving the first wafer brush away from the first side of the wafer.

20 Claims, 26 Drawing Sheets



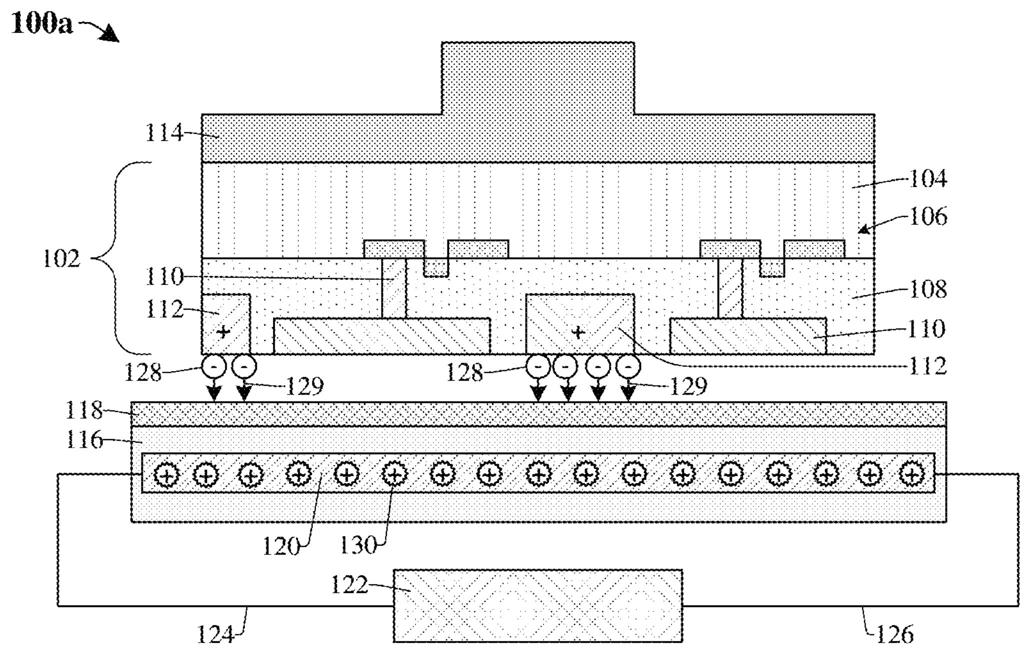

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Fig. 1A

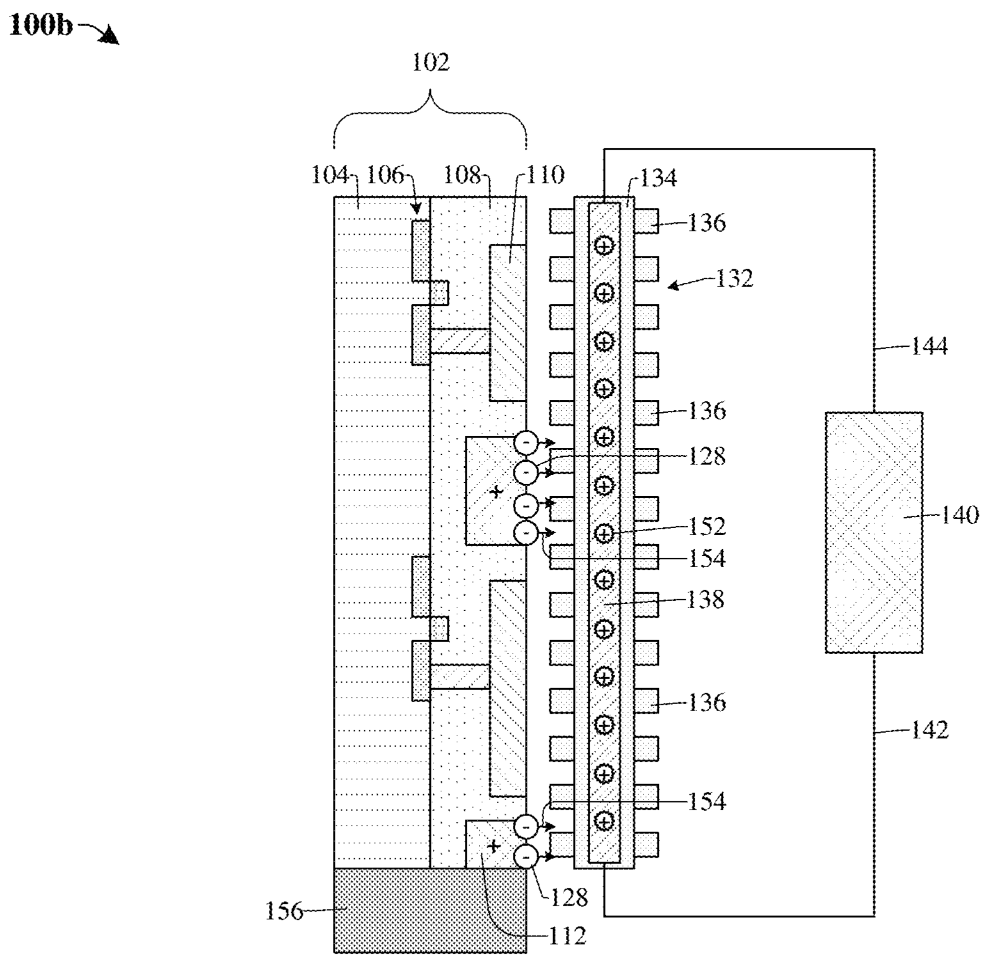
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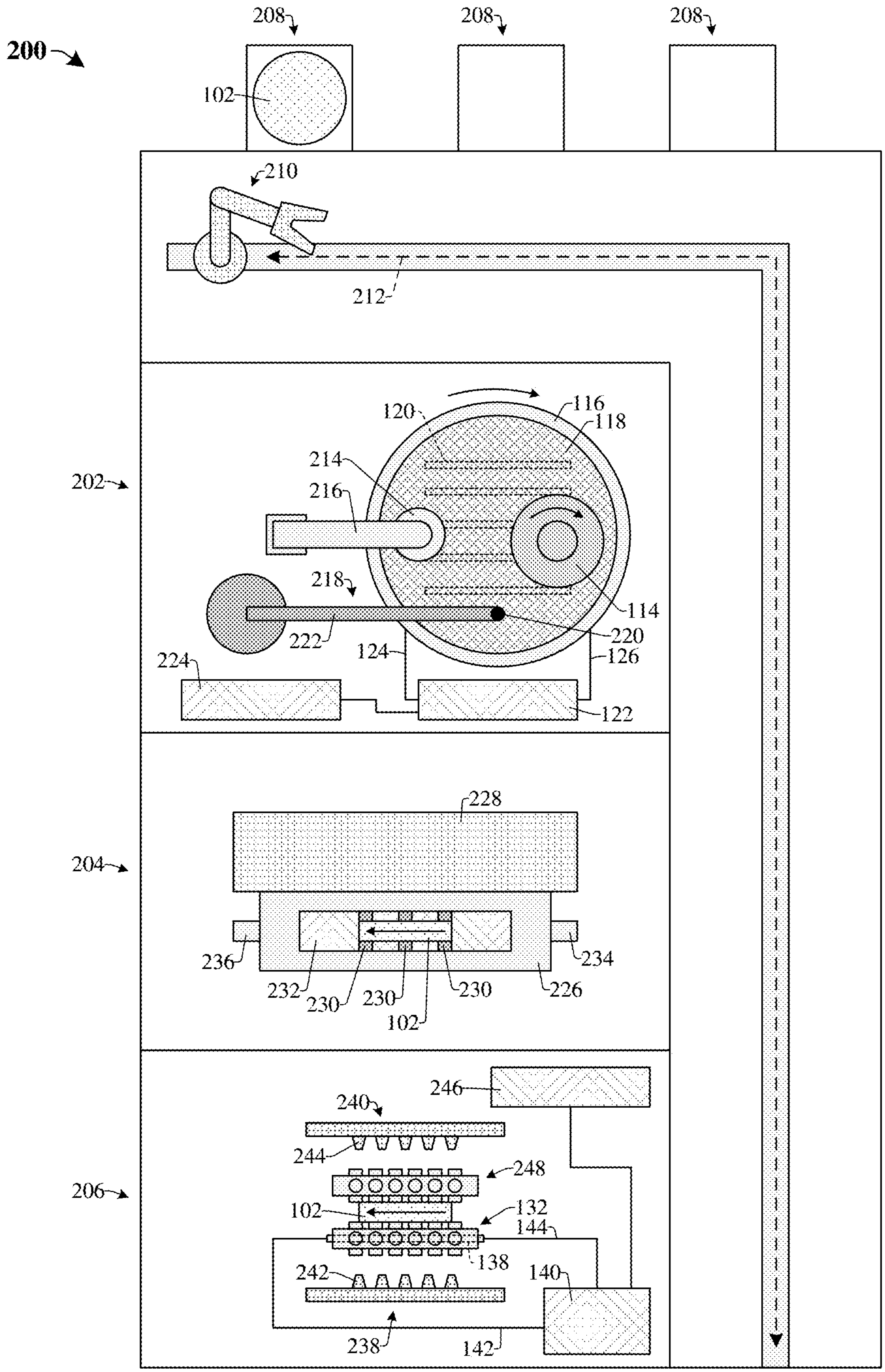
Fig. 1B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228
236
234
232
230
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102
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138
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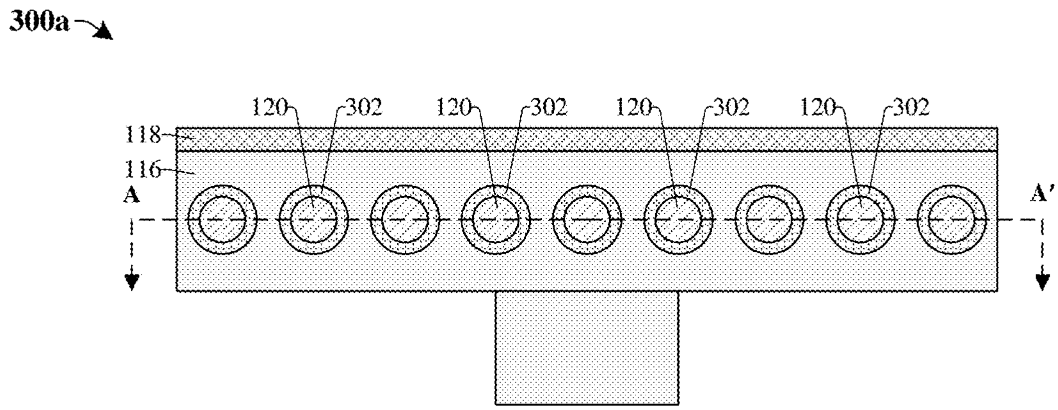
142

Fig. 2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A
A'

Fig. 3A

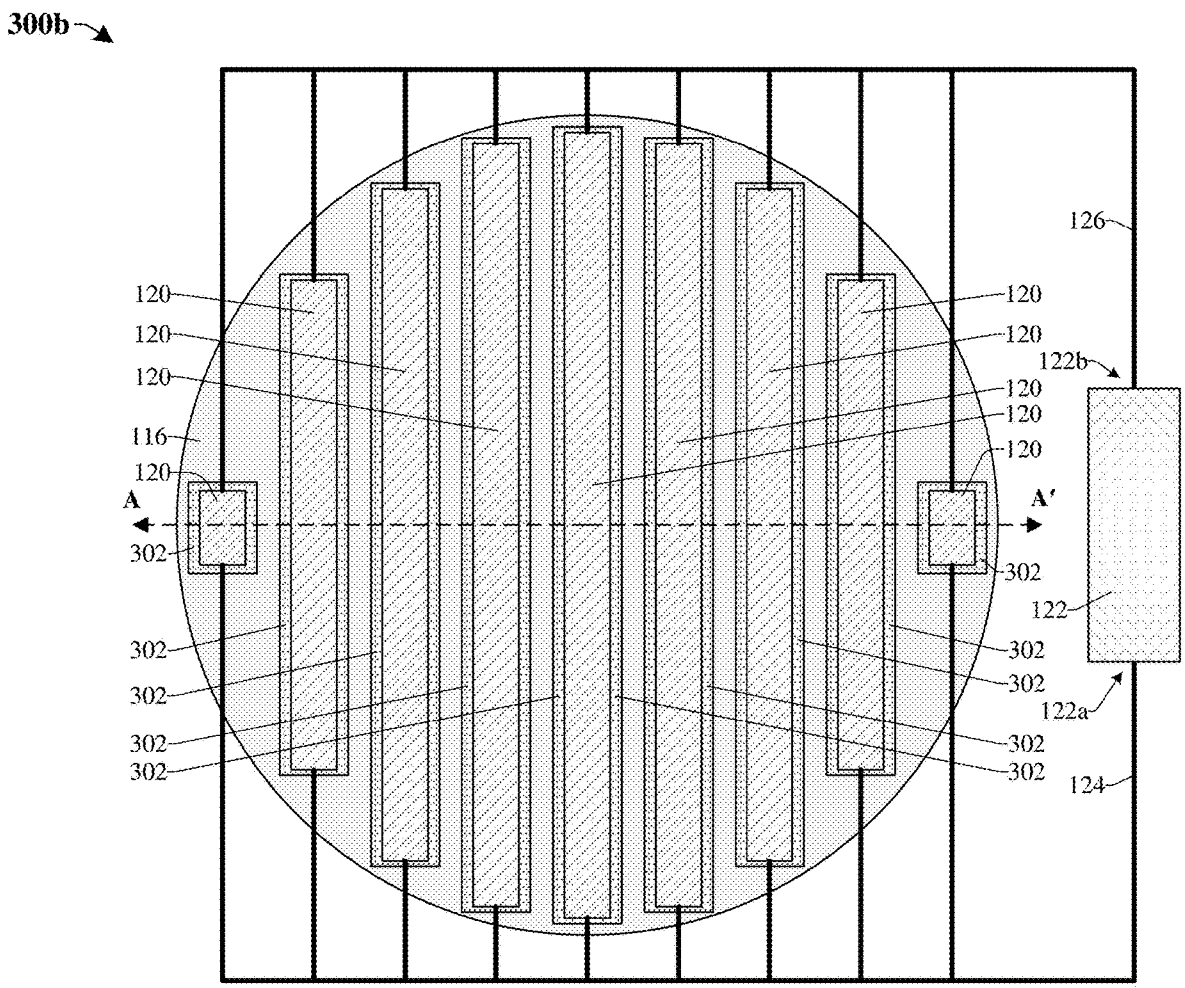
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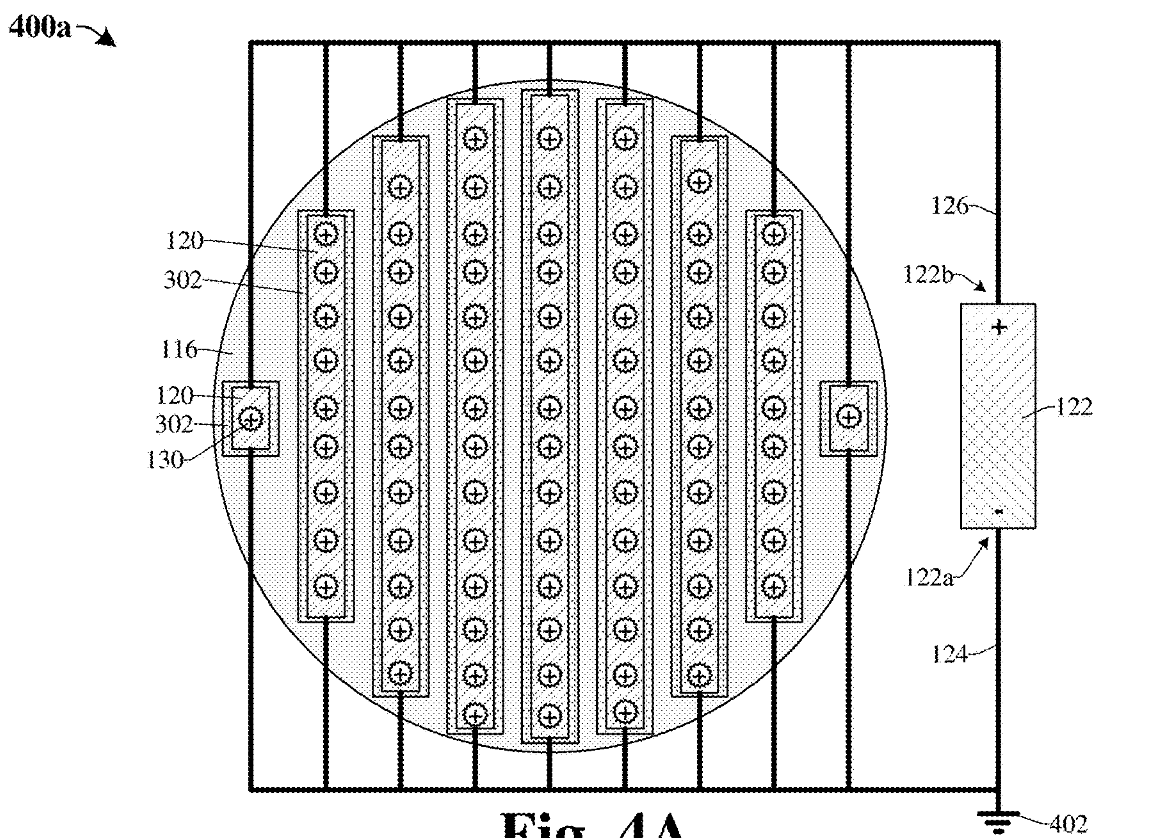
Fig. 3B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116
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130
126
122b
+
122
-
122a
124
402

Fig. 4A

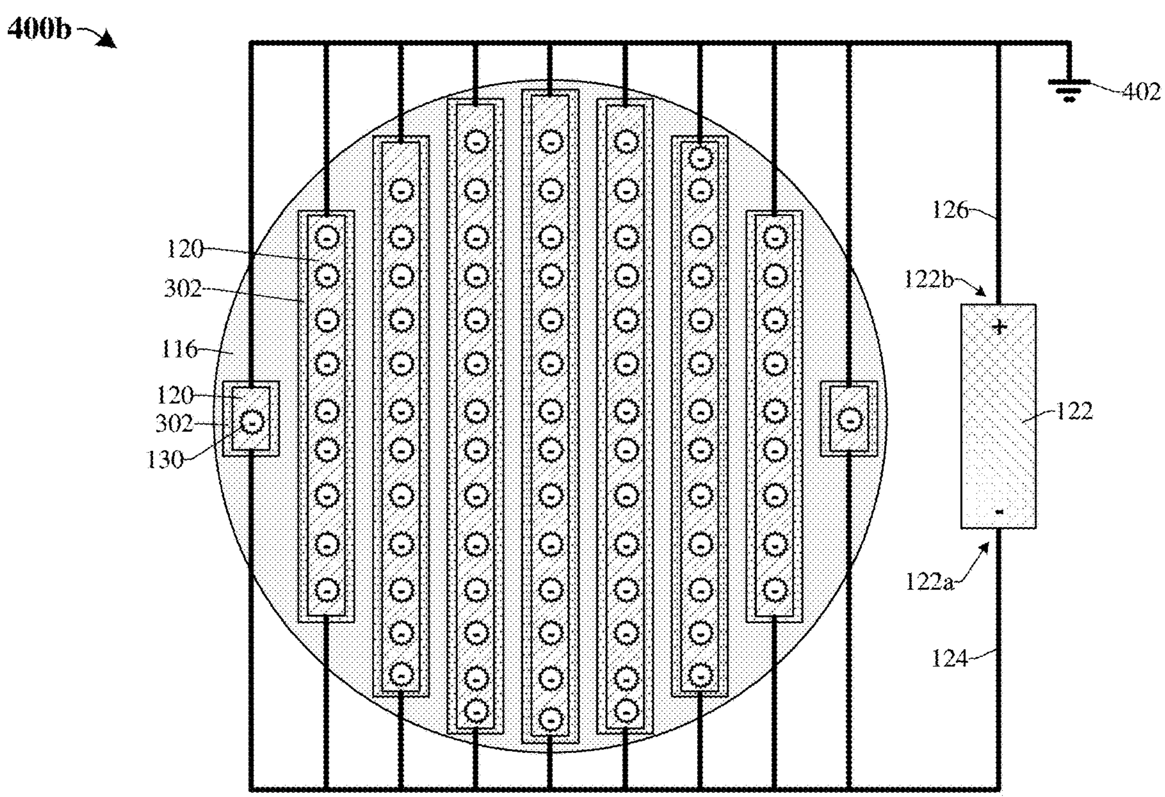
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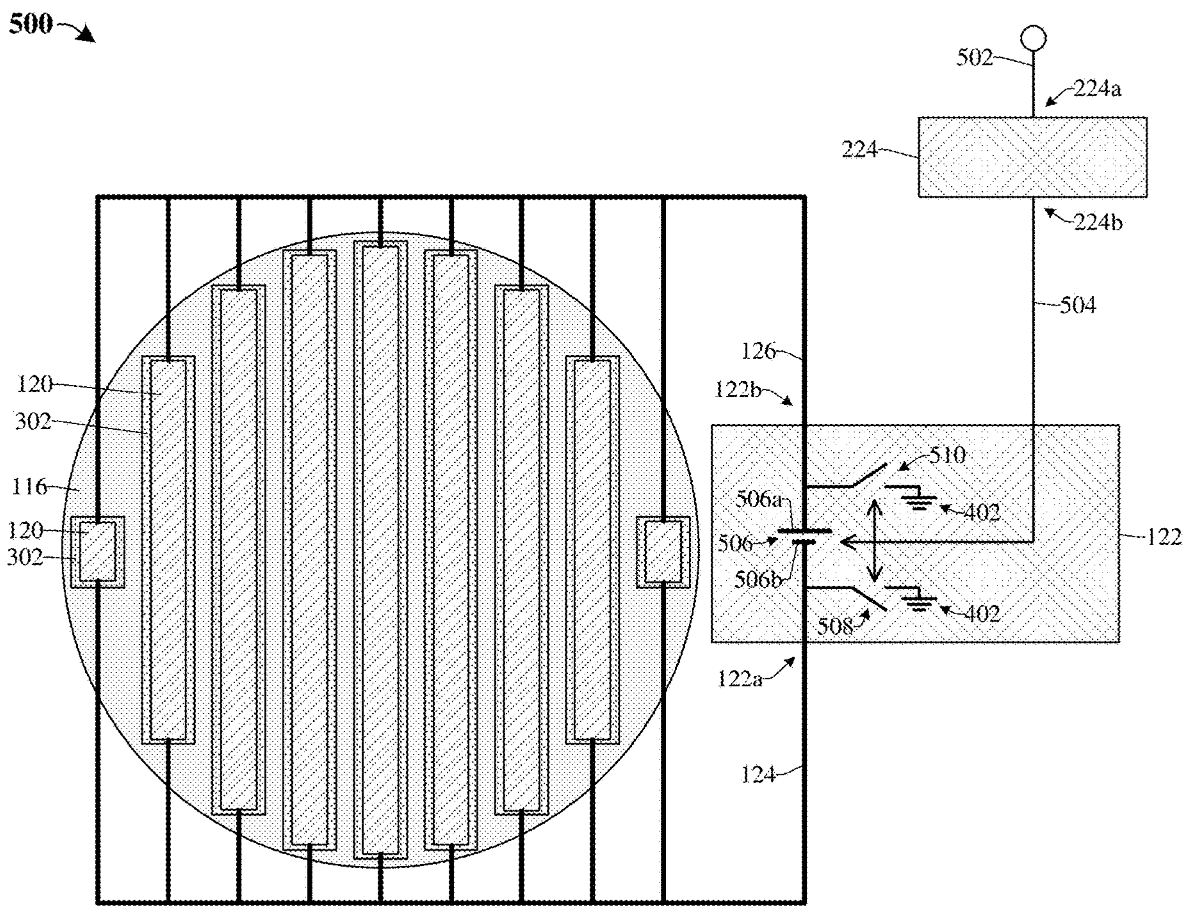
Fig. 4B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224b
504
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506a
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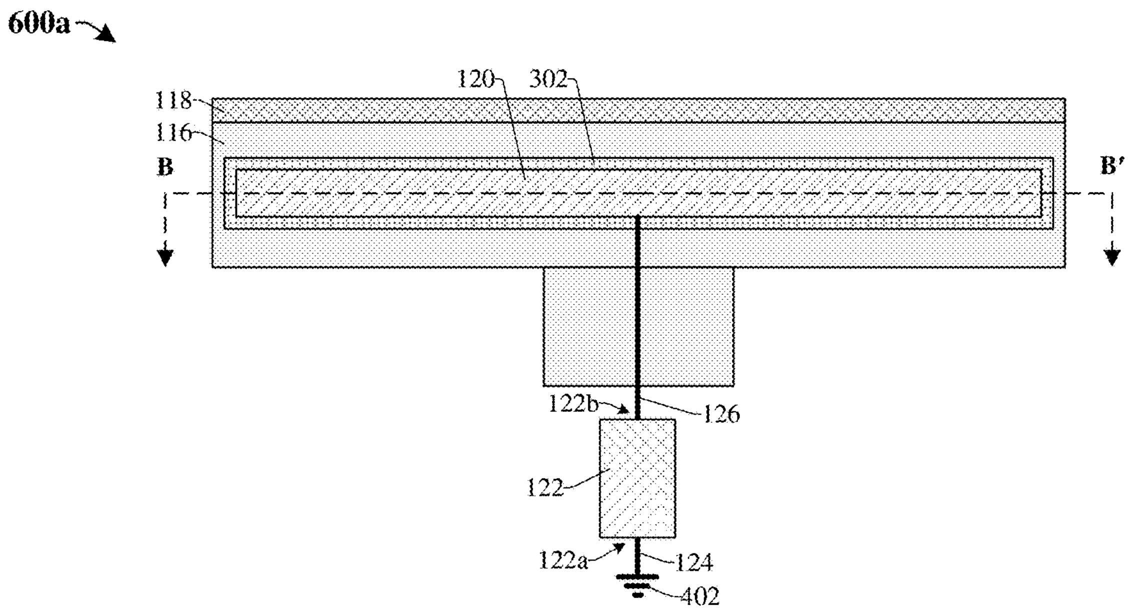
506
122
506b
402
508
122a
124

Fig. 5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118
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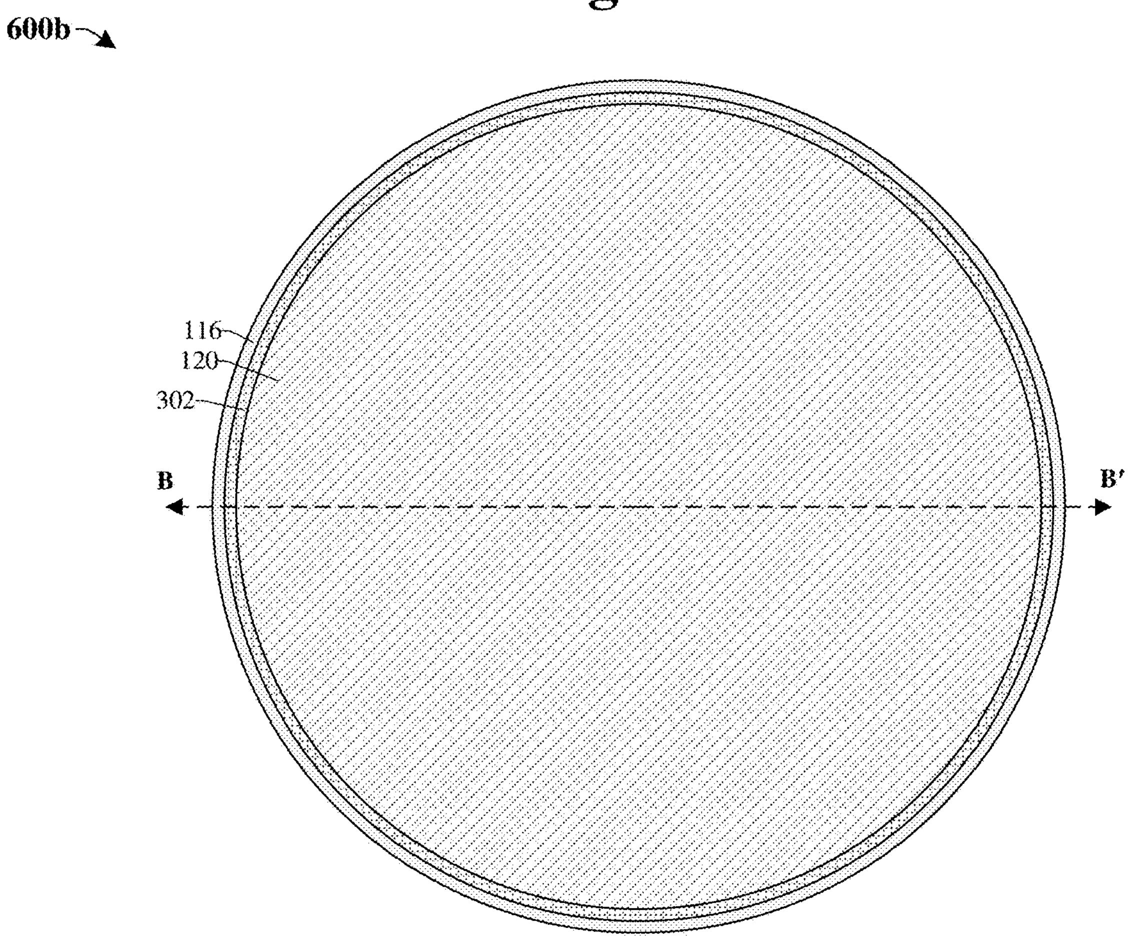
120
302
B
B'
122b
126
122
122a
124
402

Fig. 6A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116
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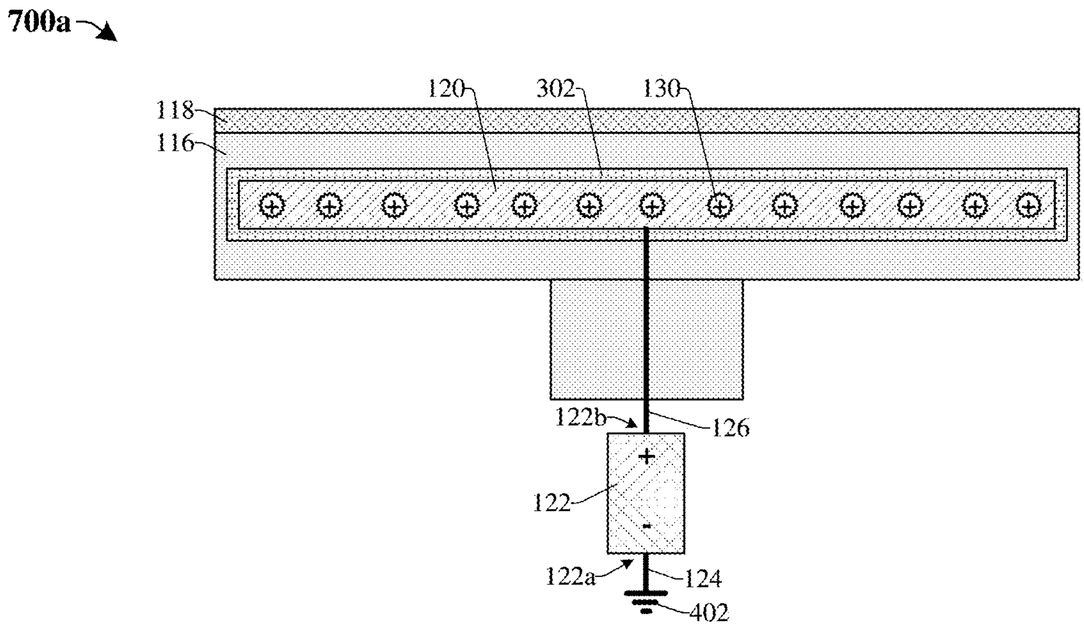
302
B
B'

Fig. 6B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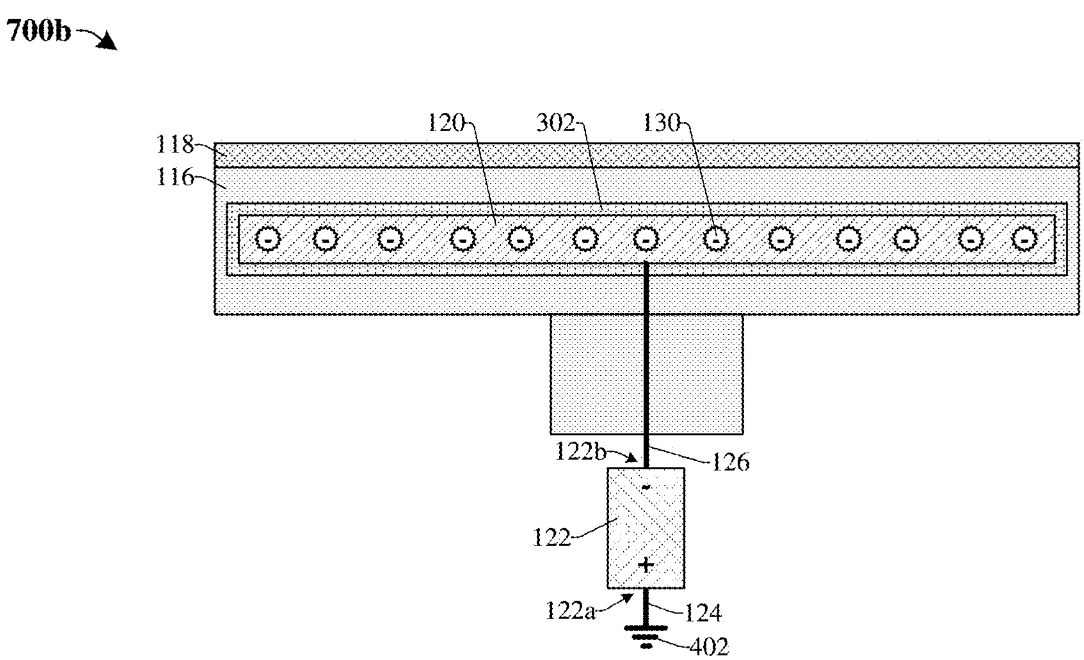
130
122b
126
+
122
-
122a
124
402

Fig. 7A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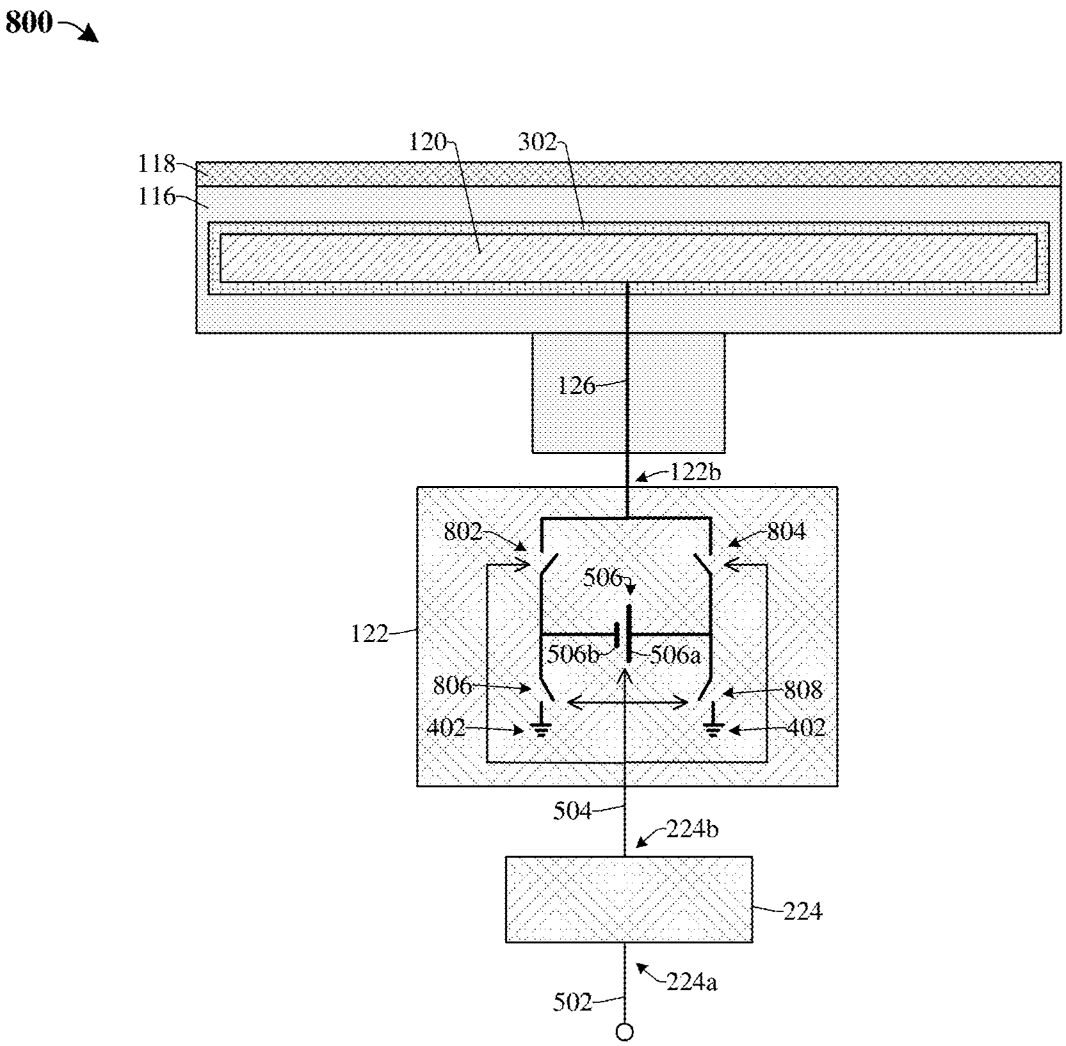
-
122
+
122a
124
402

Fig. 7B



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116
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122b
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804
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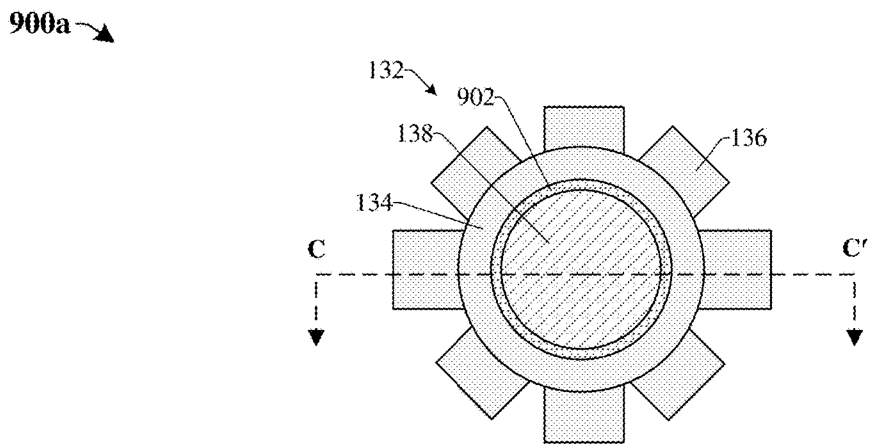
122
506b
506a
806
808
402
402
504
224b
224
224a
502

Fig. 8


900a
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902
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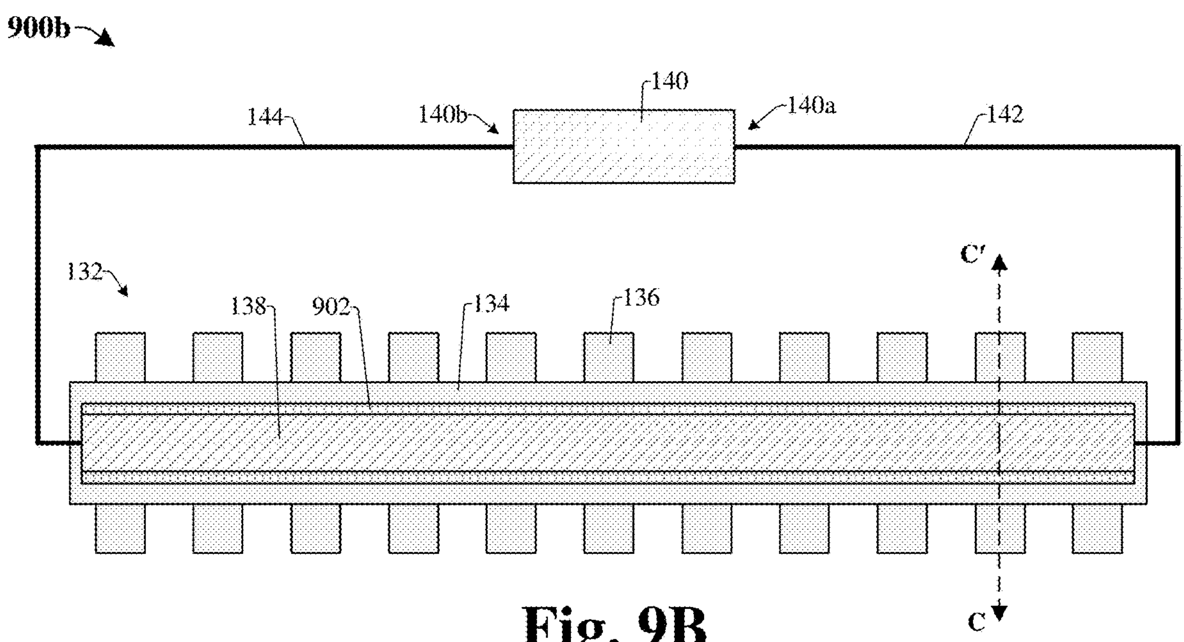
136
134
C
C′

Fig. 9A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C′
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134
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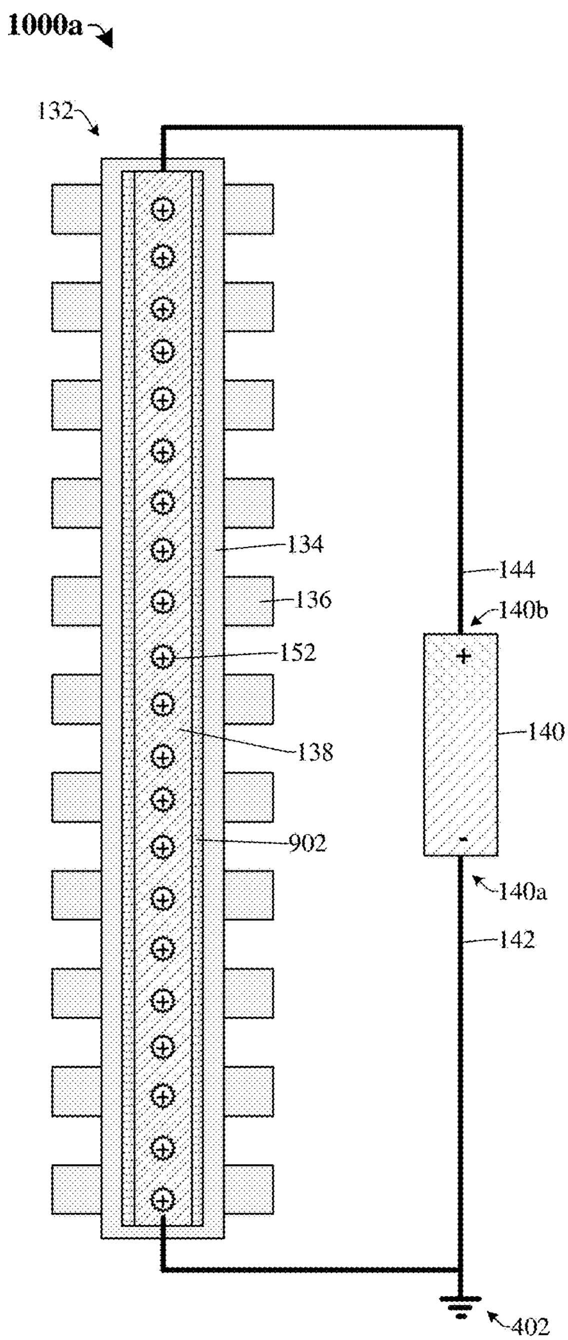
C

Fig. 9B



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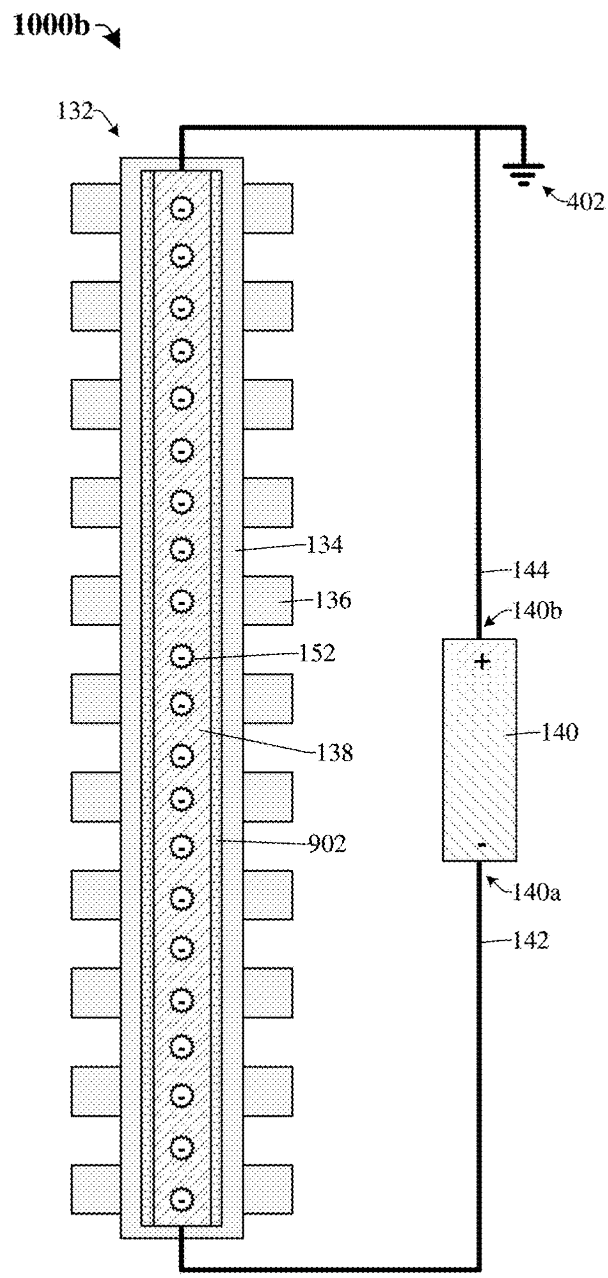

Fig. 10B

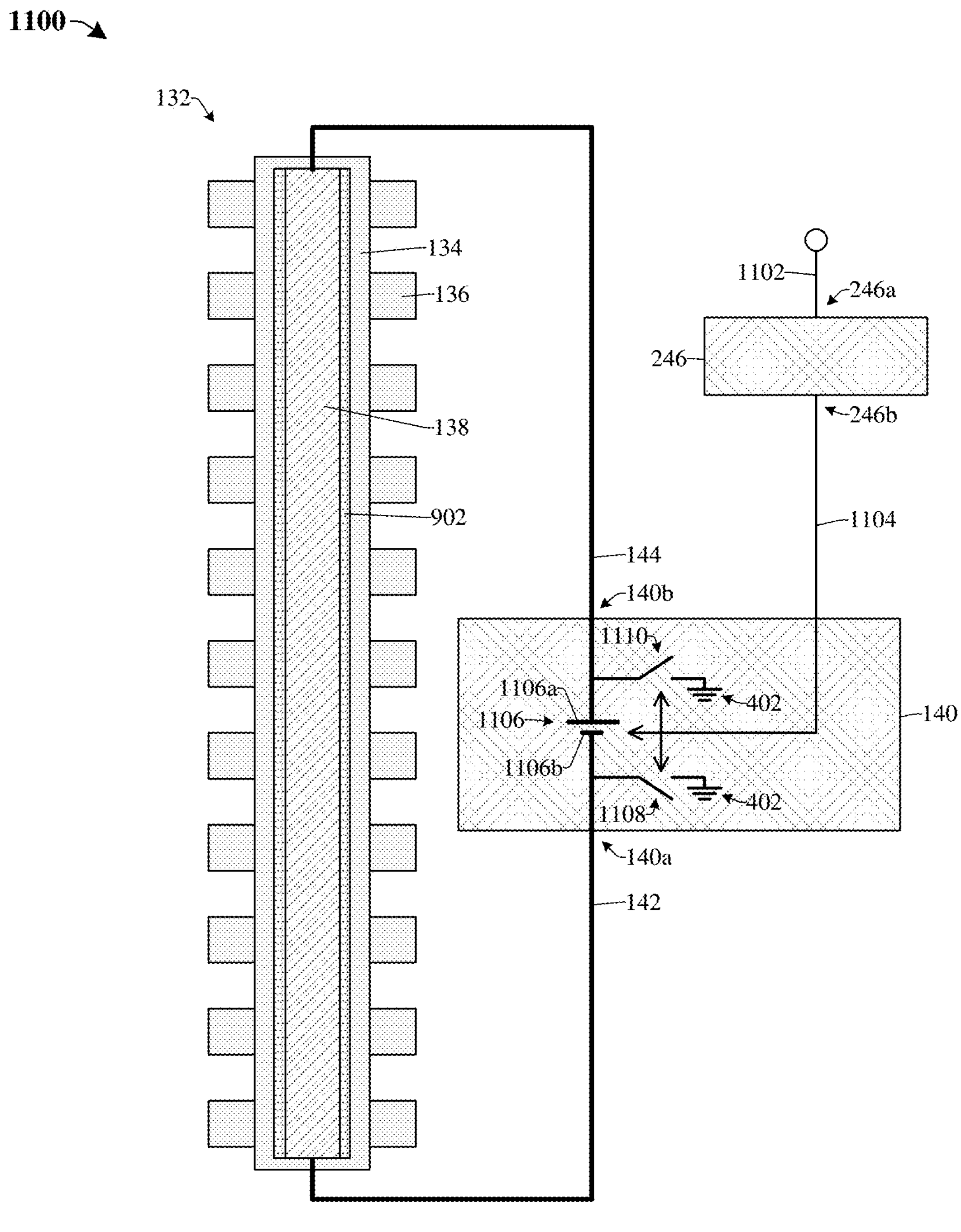
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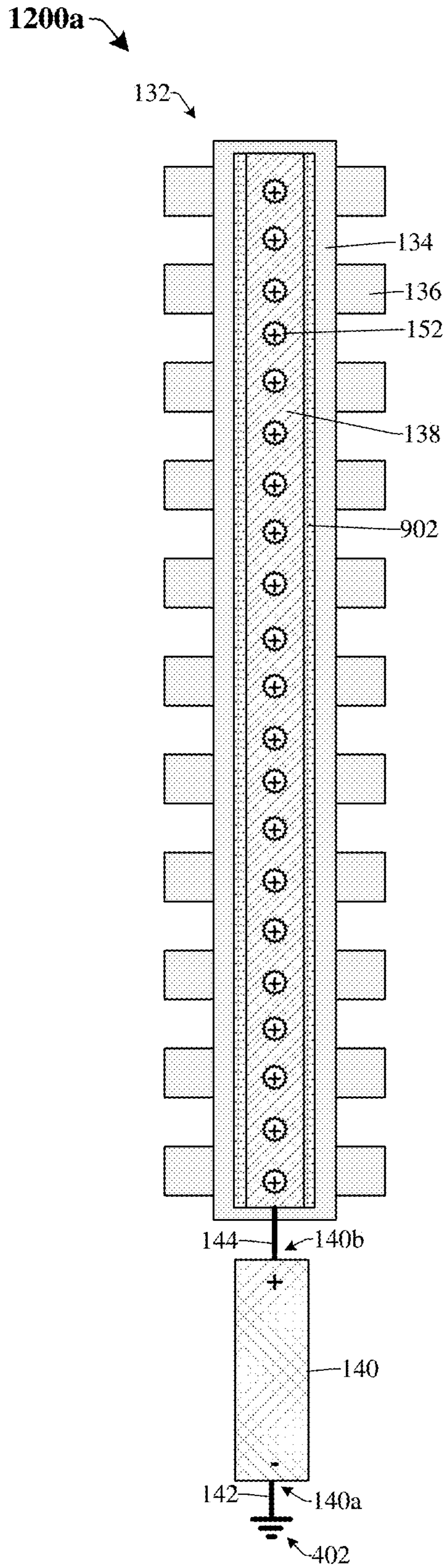
Fig. 11



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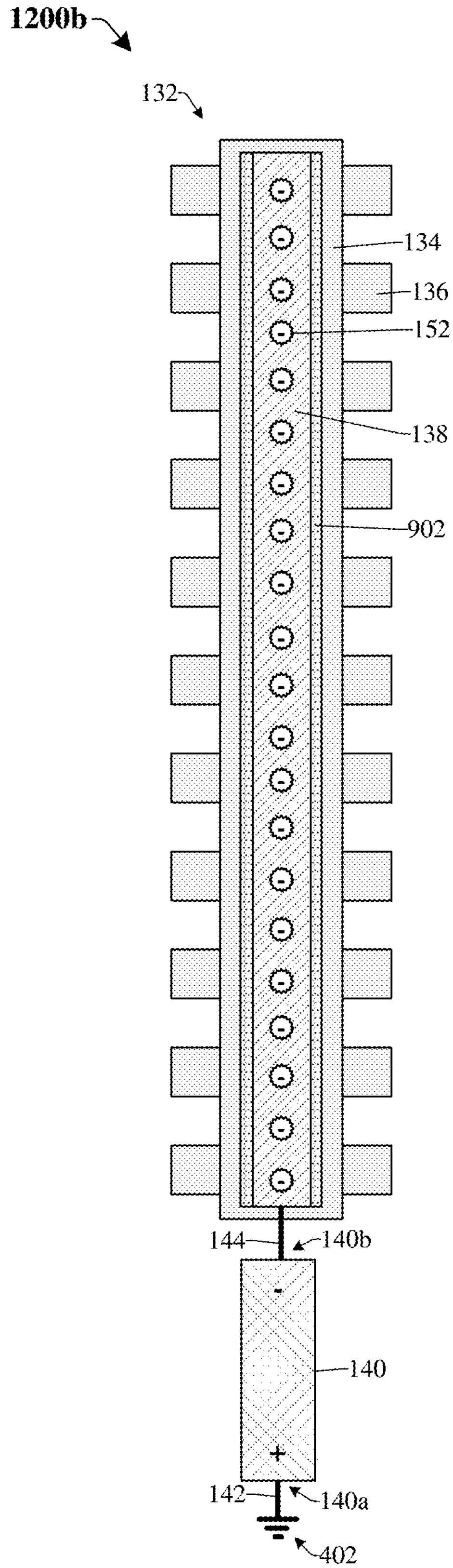

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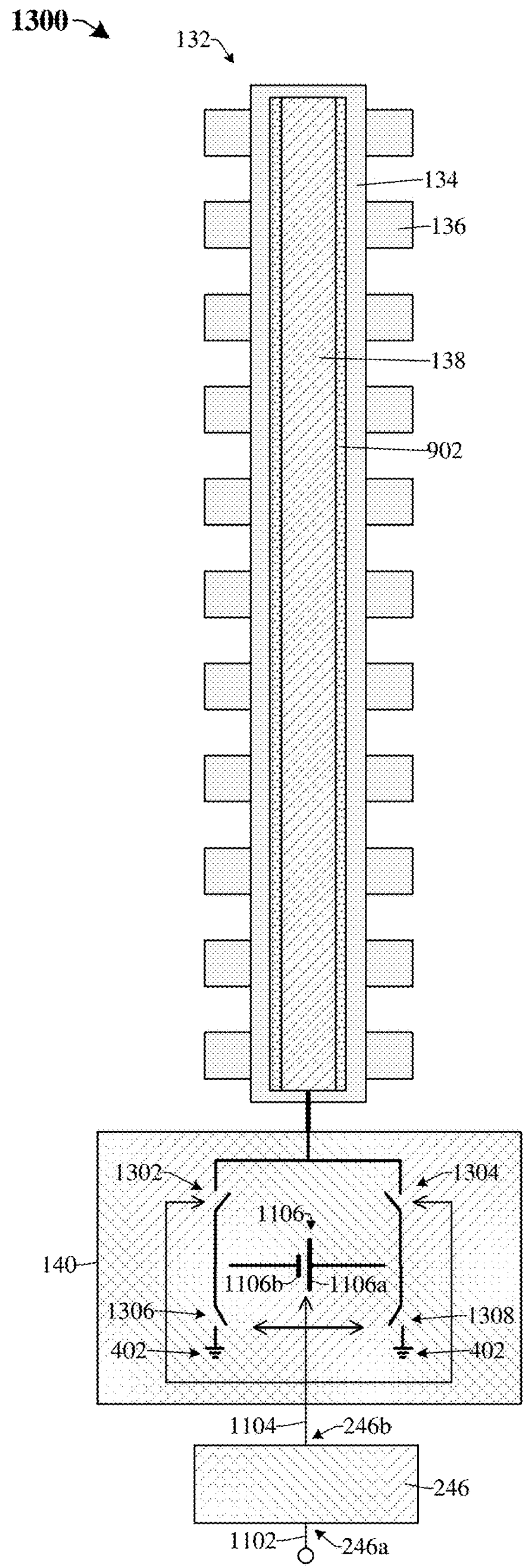
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902
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246b
246
1102
246a

Fig. 13

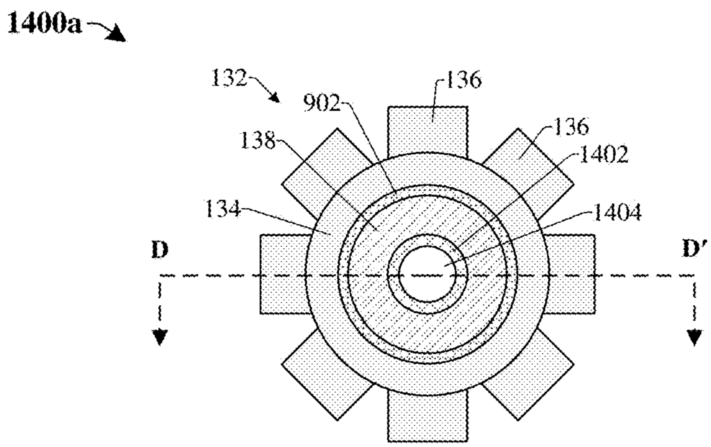


Fig. 14A

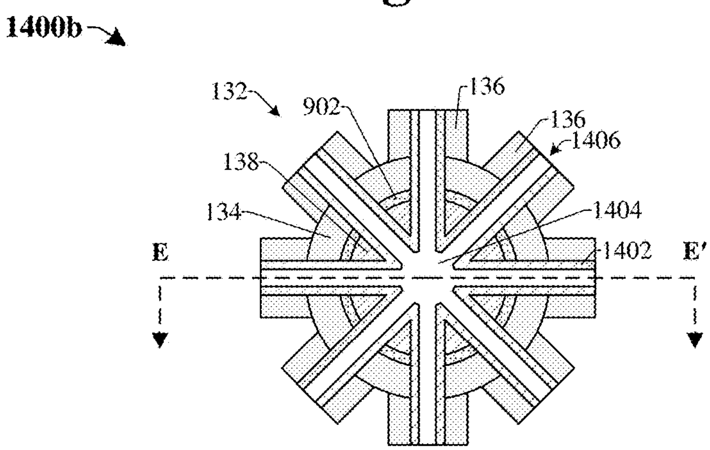


Fig. 14B

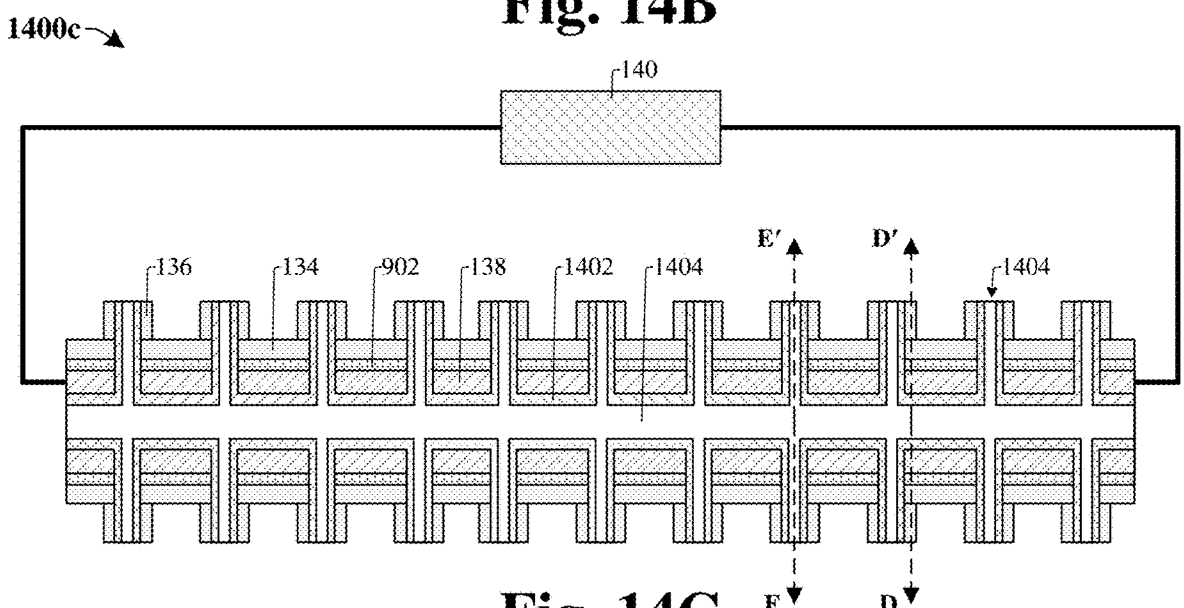


Fig. 14C

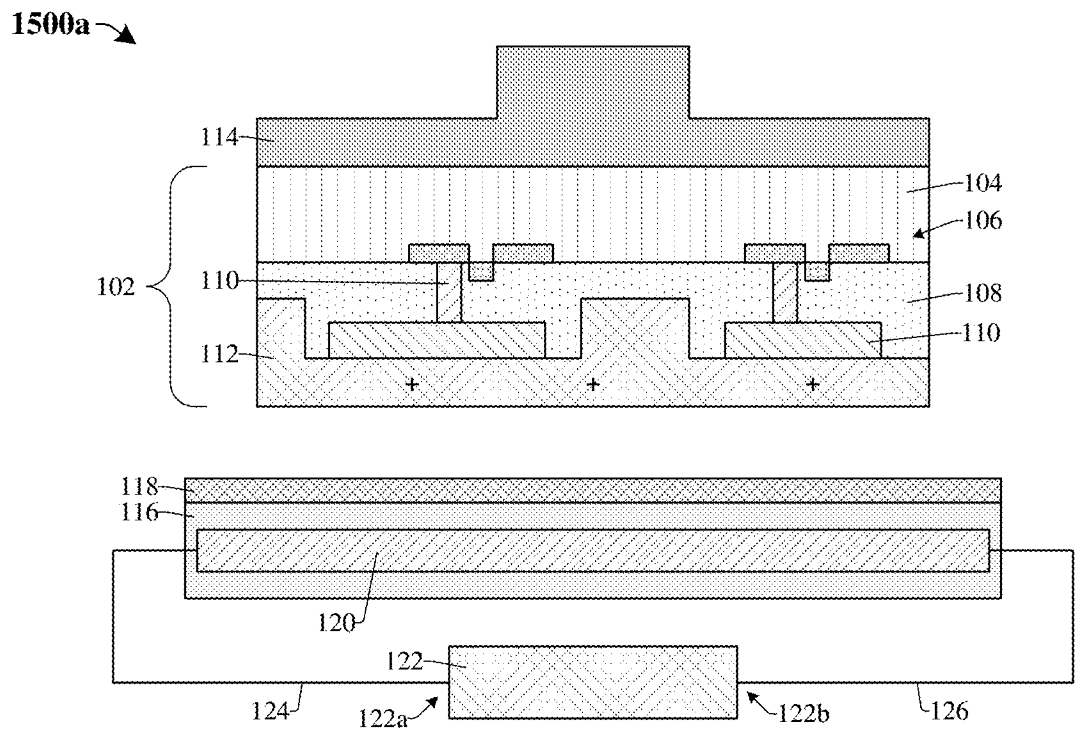


Fig. 15A

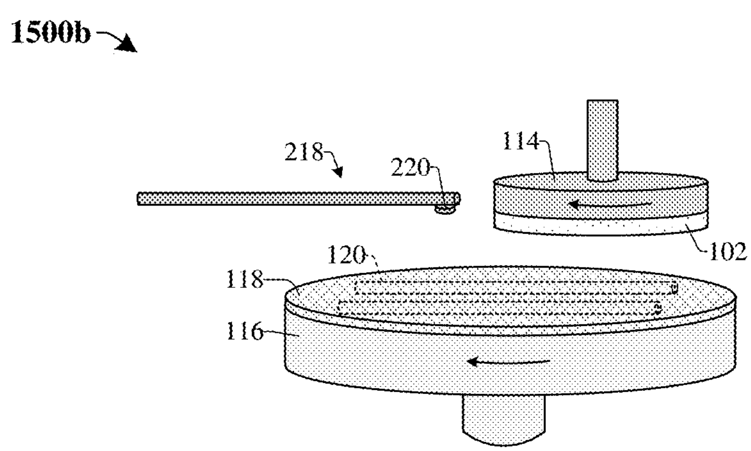
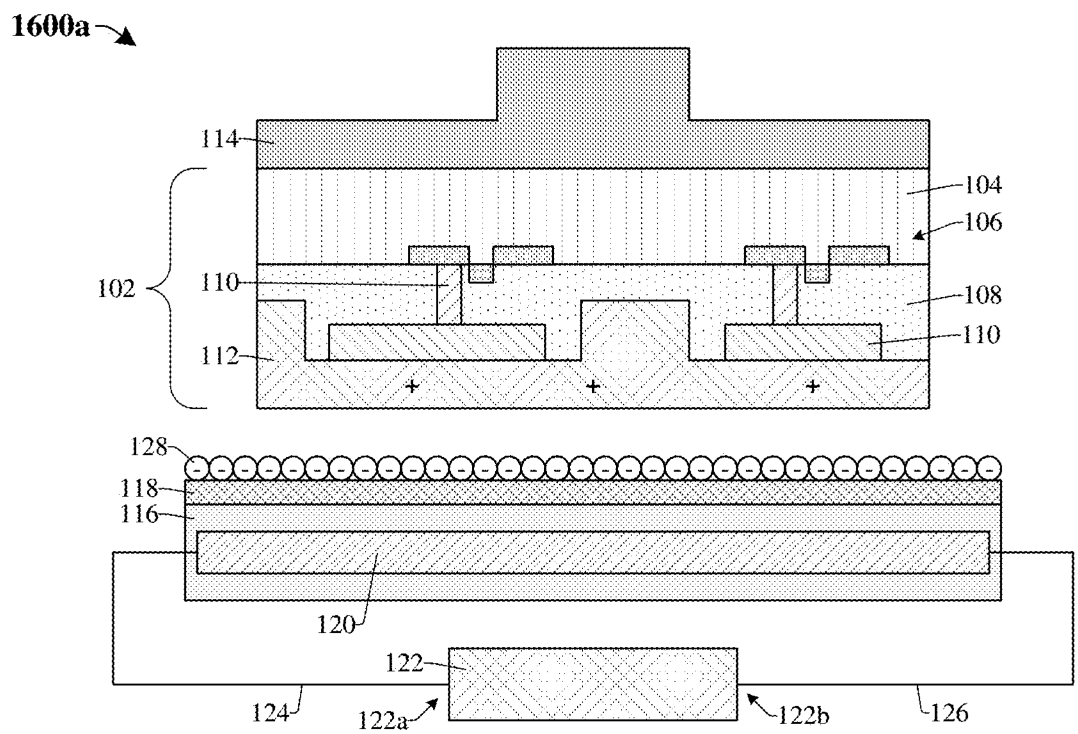


Fig. 15B



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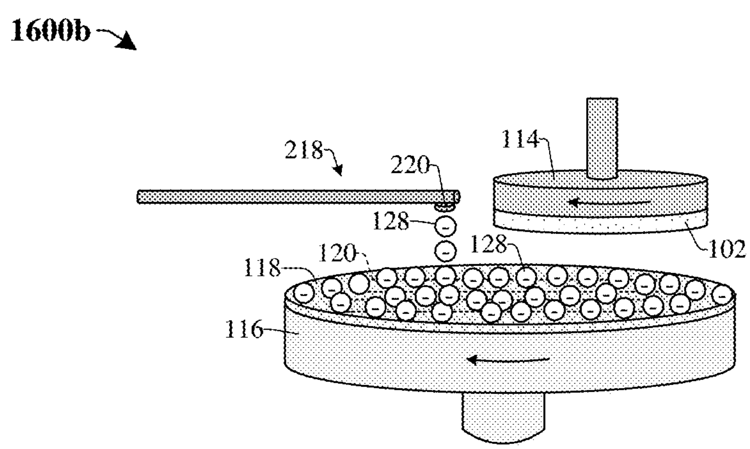

Fig. 16B

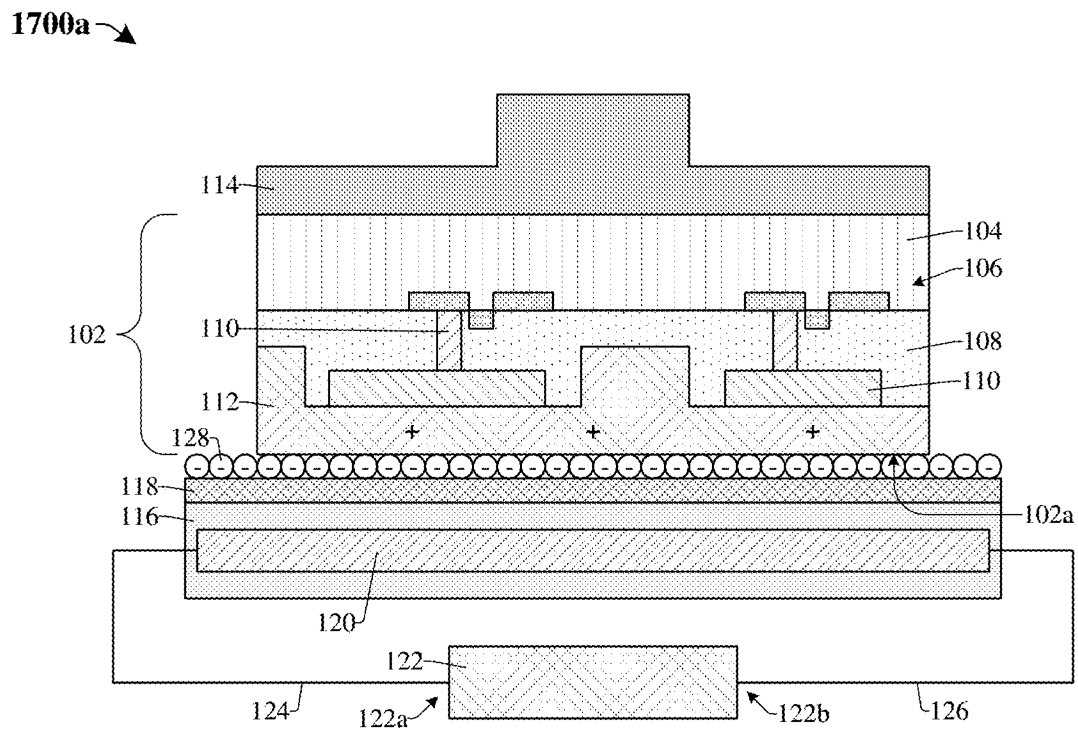

Fig. 17A

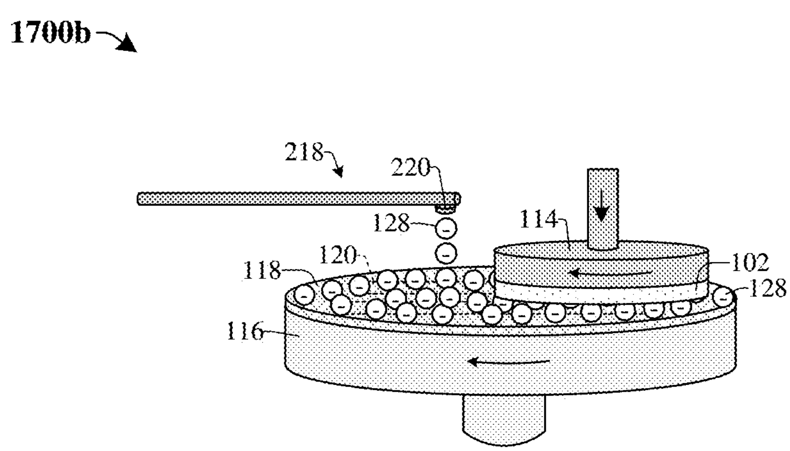

Fig. 17B

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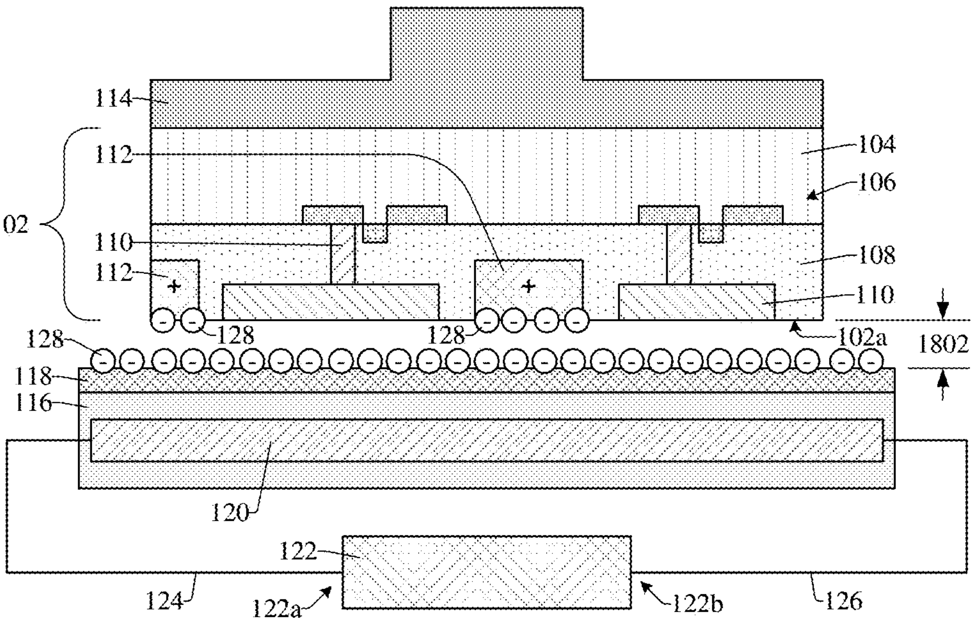

Fig. 18A

1800b

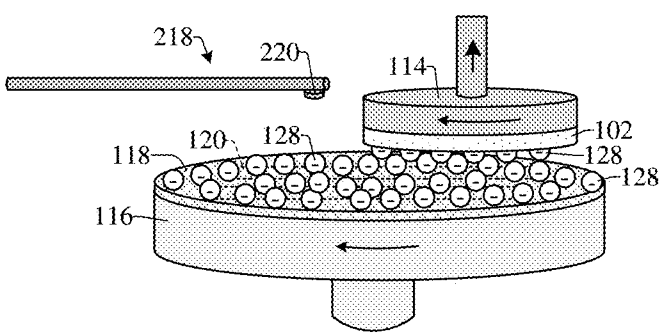

Fig. 18B

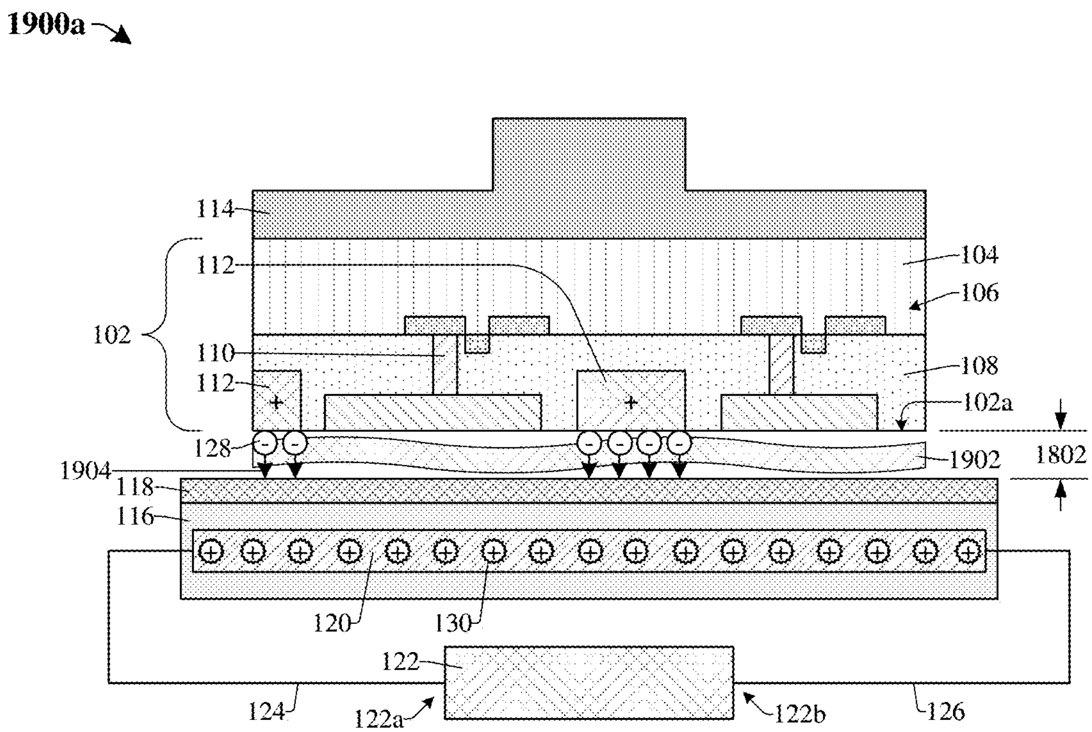

Fig. 19A

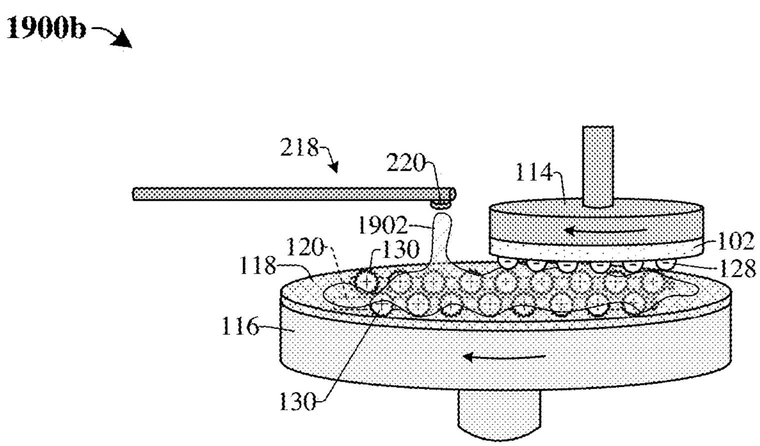

Fig. 19B

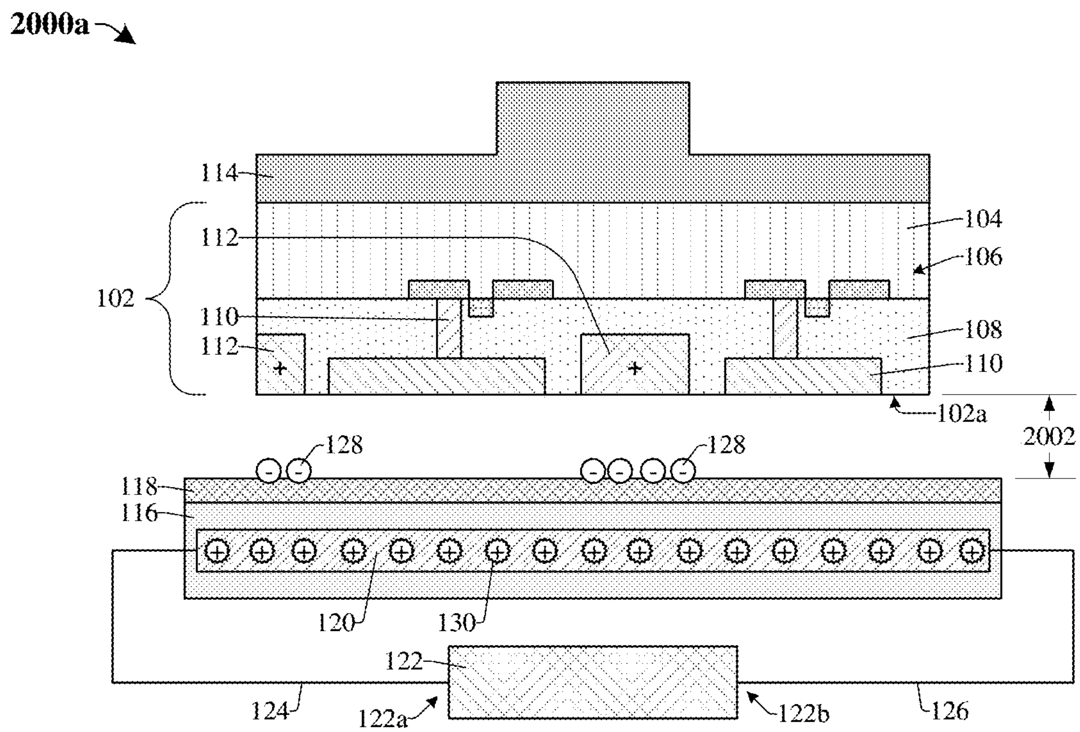

Fig. 20A

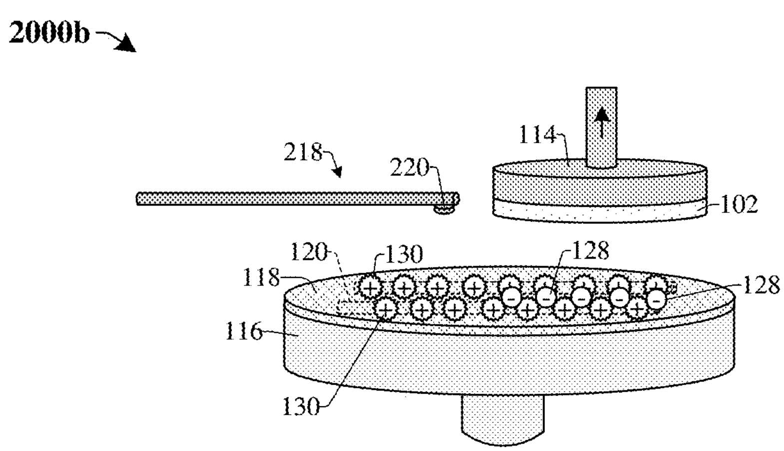

Fig. 20B

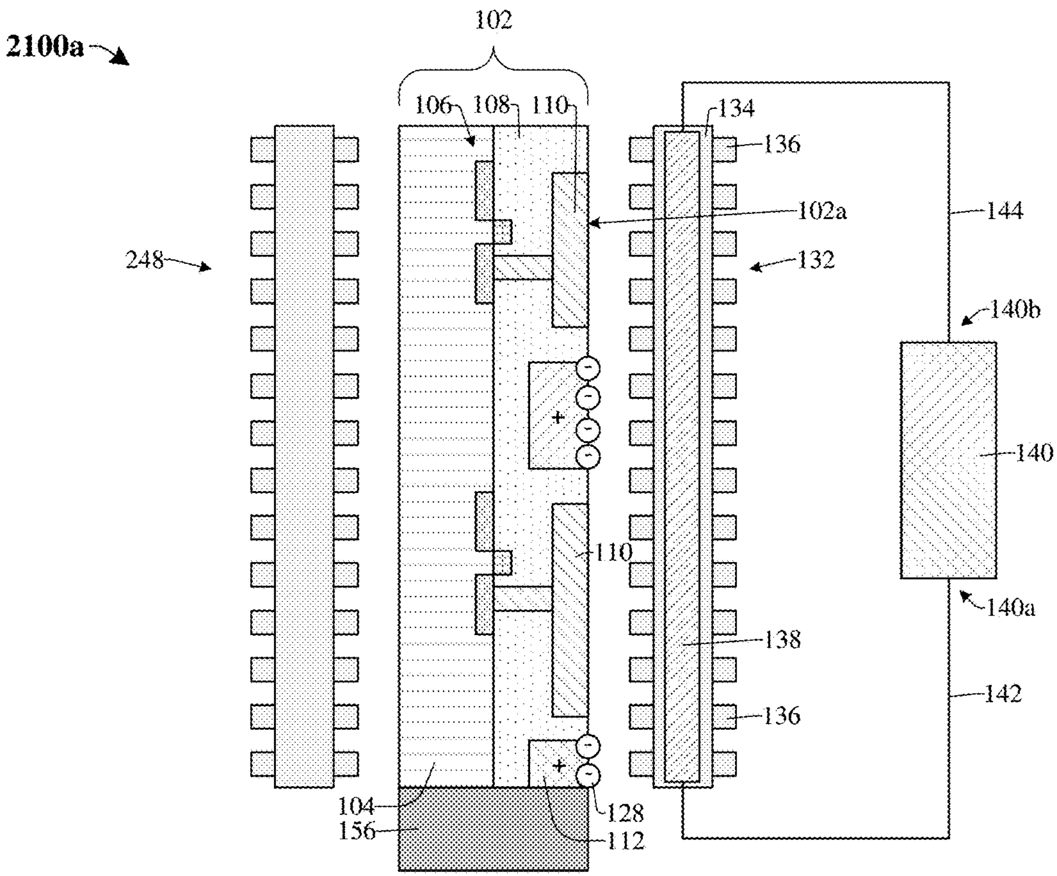

Fig. 21A

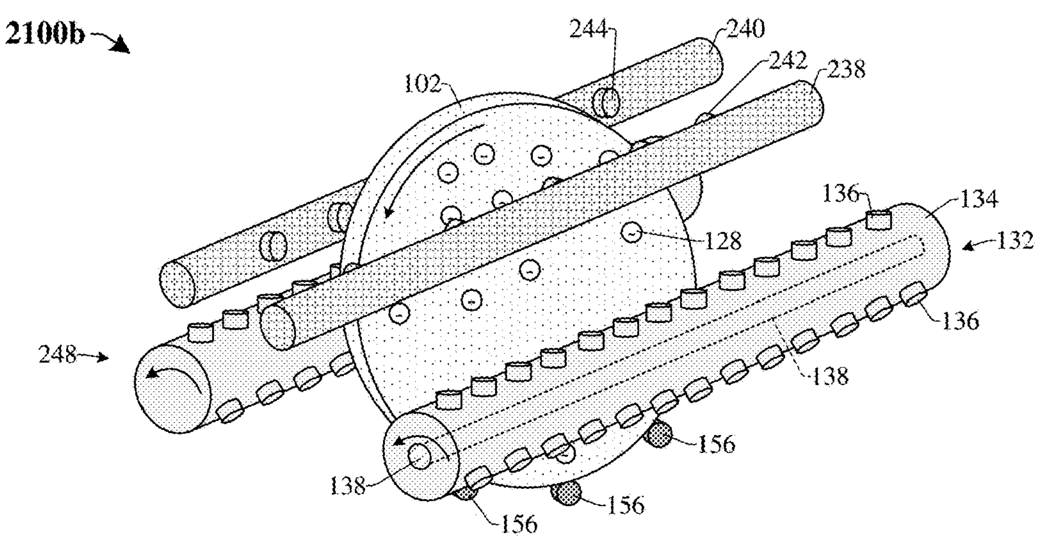

Fig. 21B

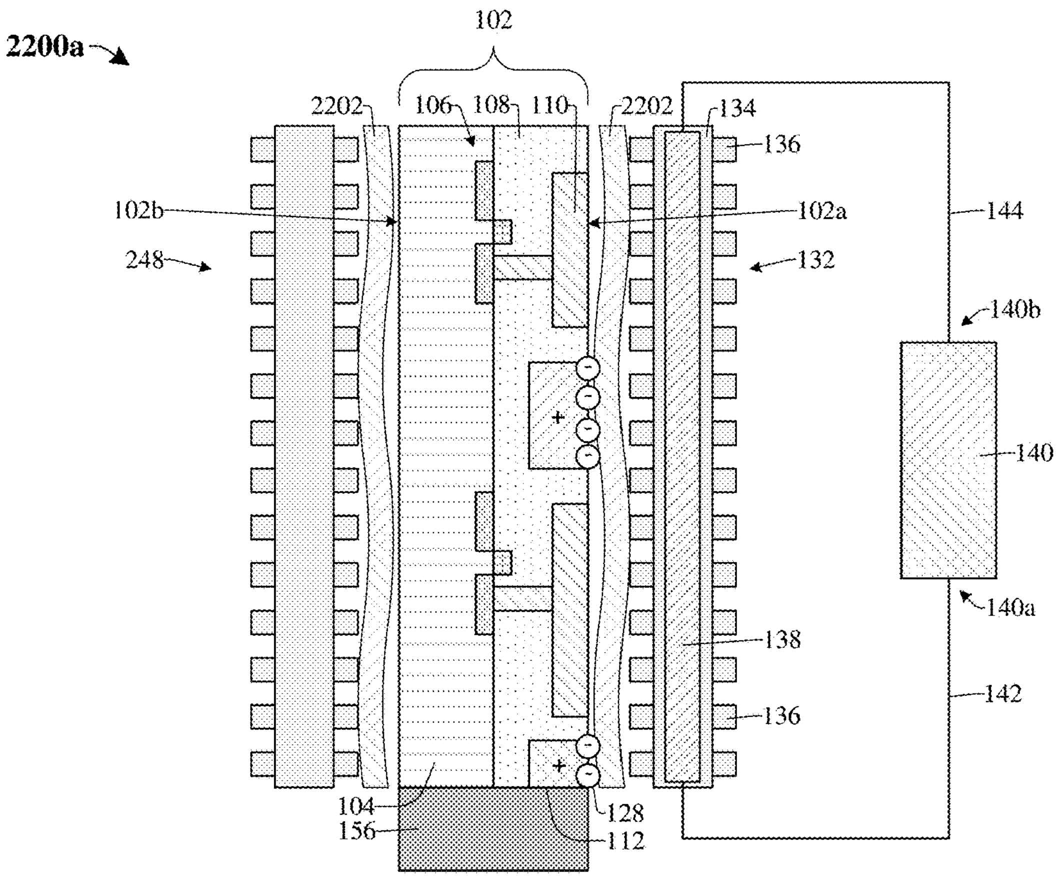

Fig. 22A

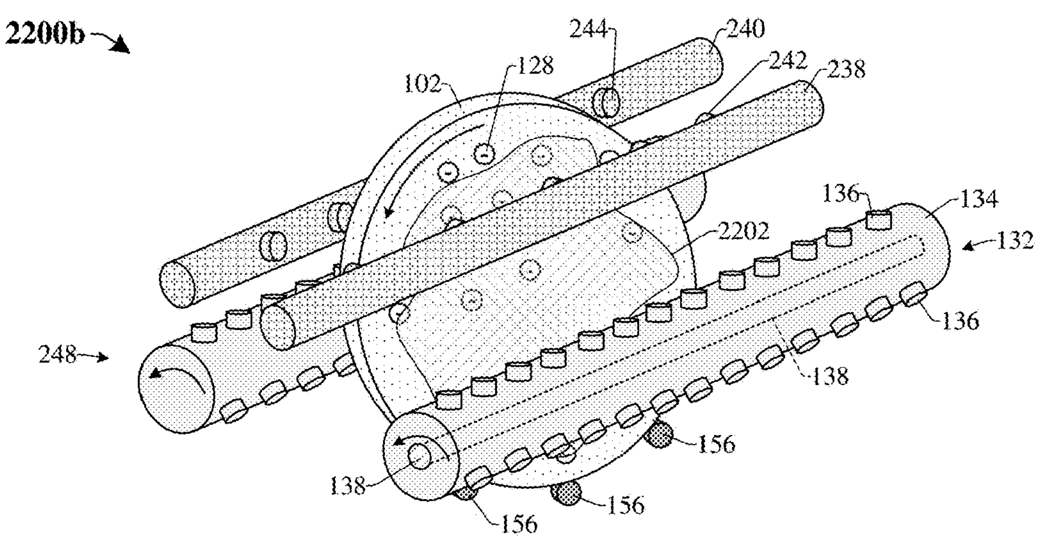

Fig. 22B

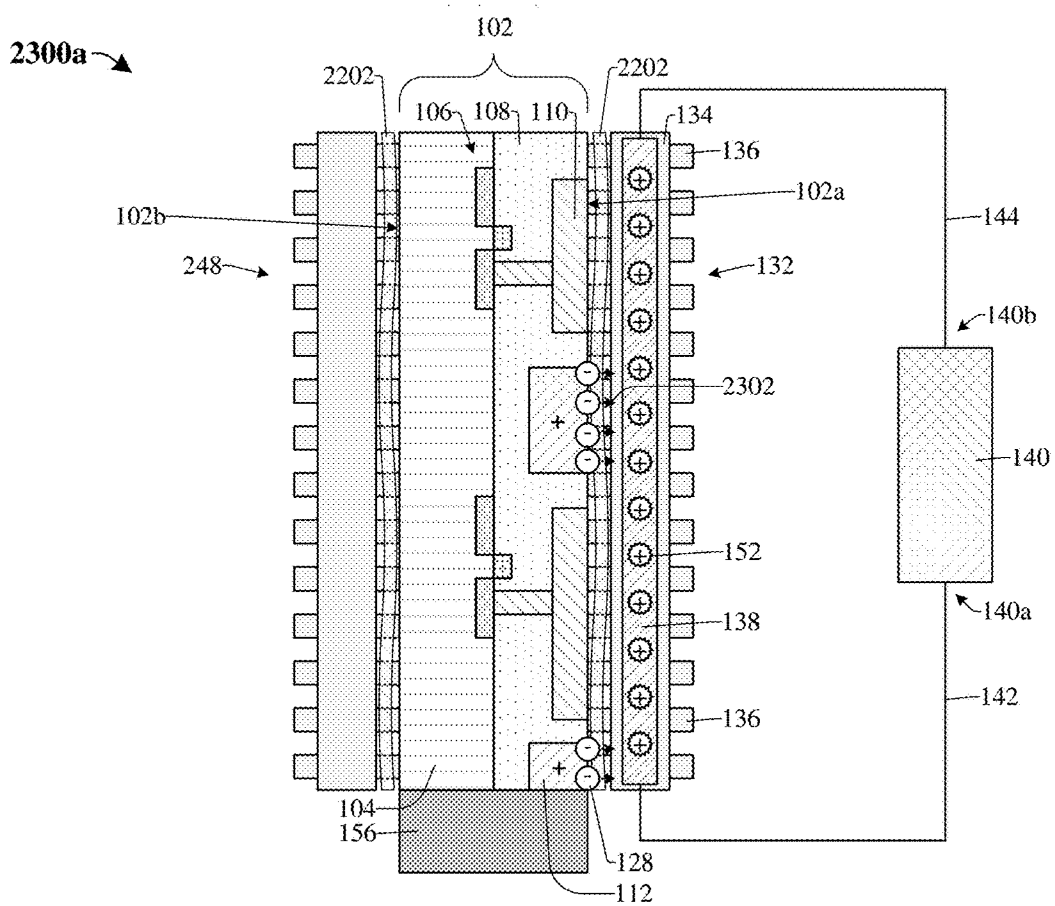

Fig. 23A

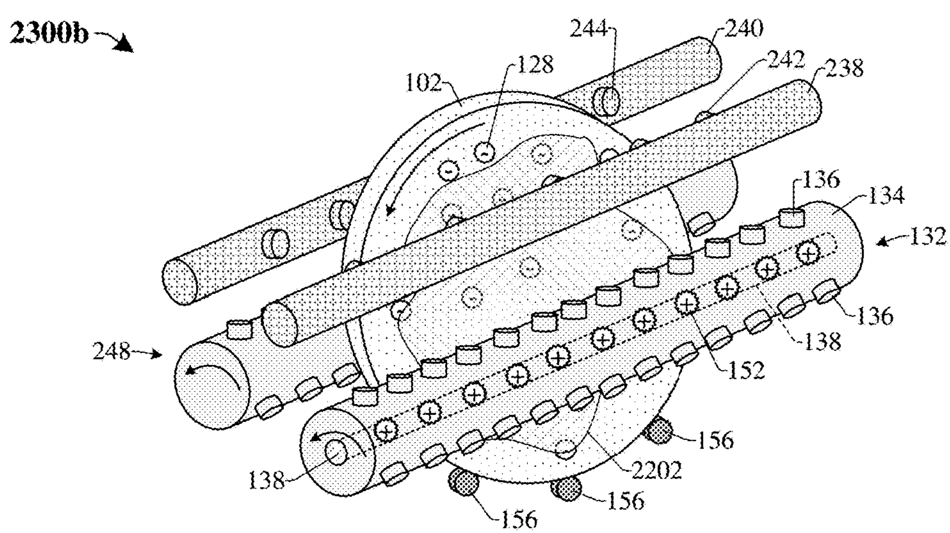

Fig. 23B

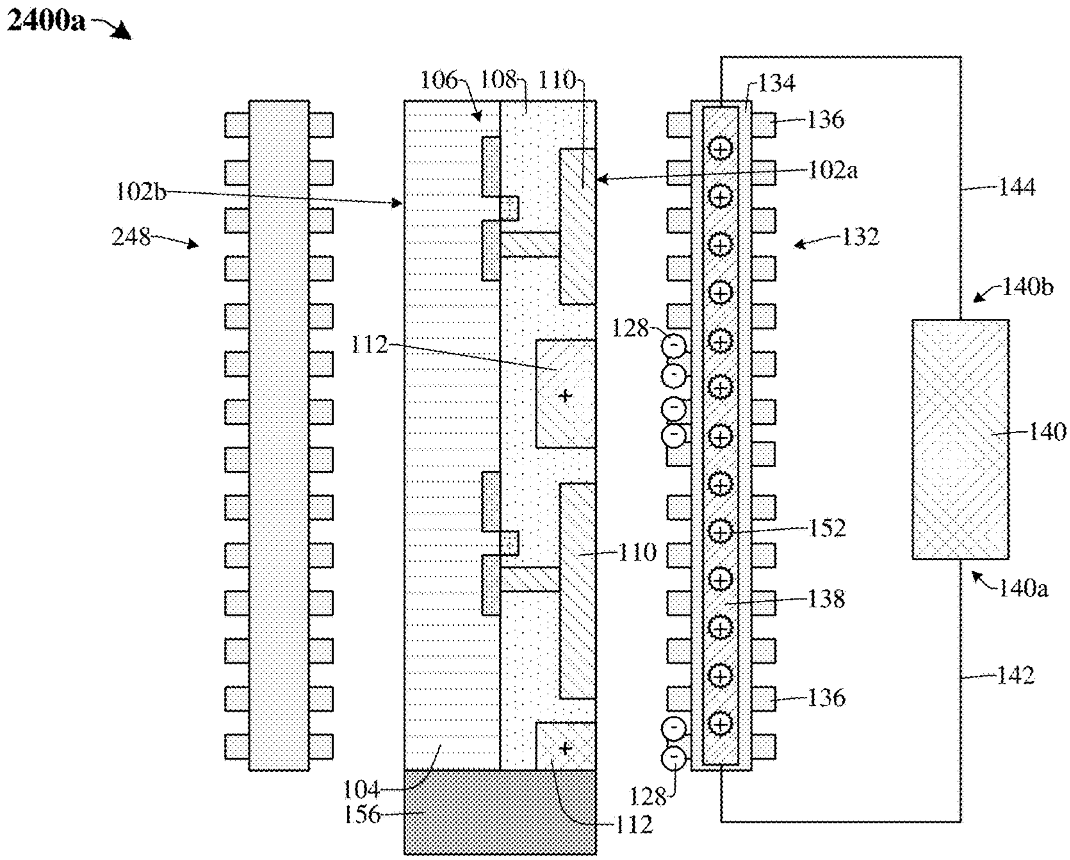

Fig. 24A

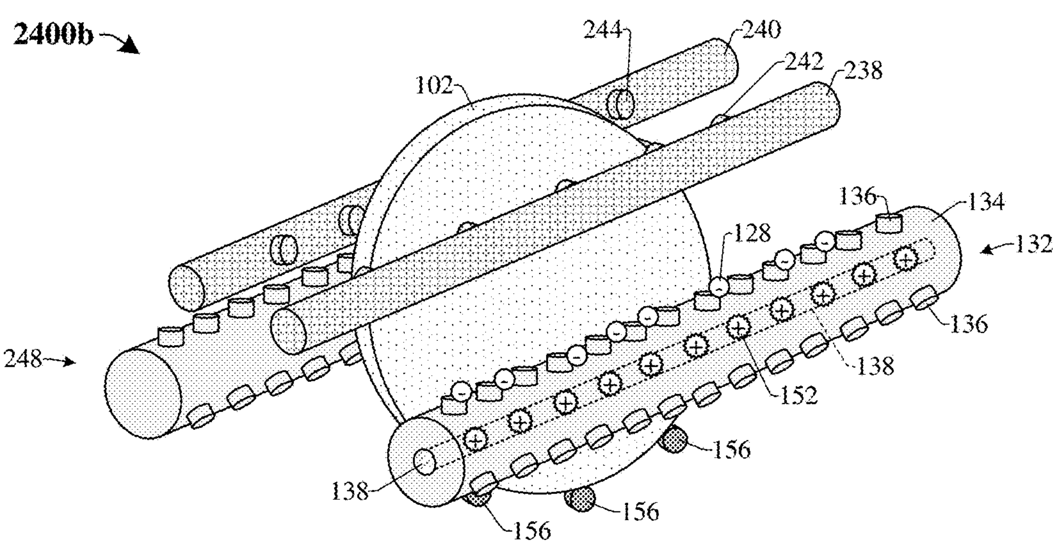

Fig. 24B

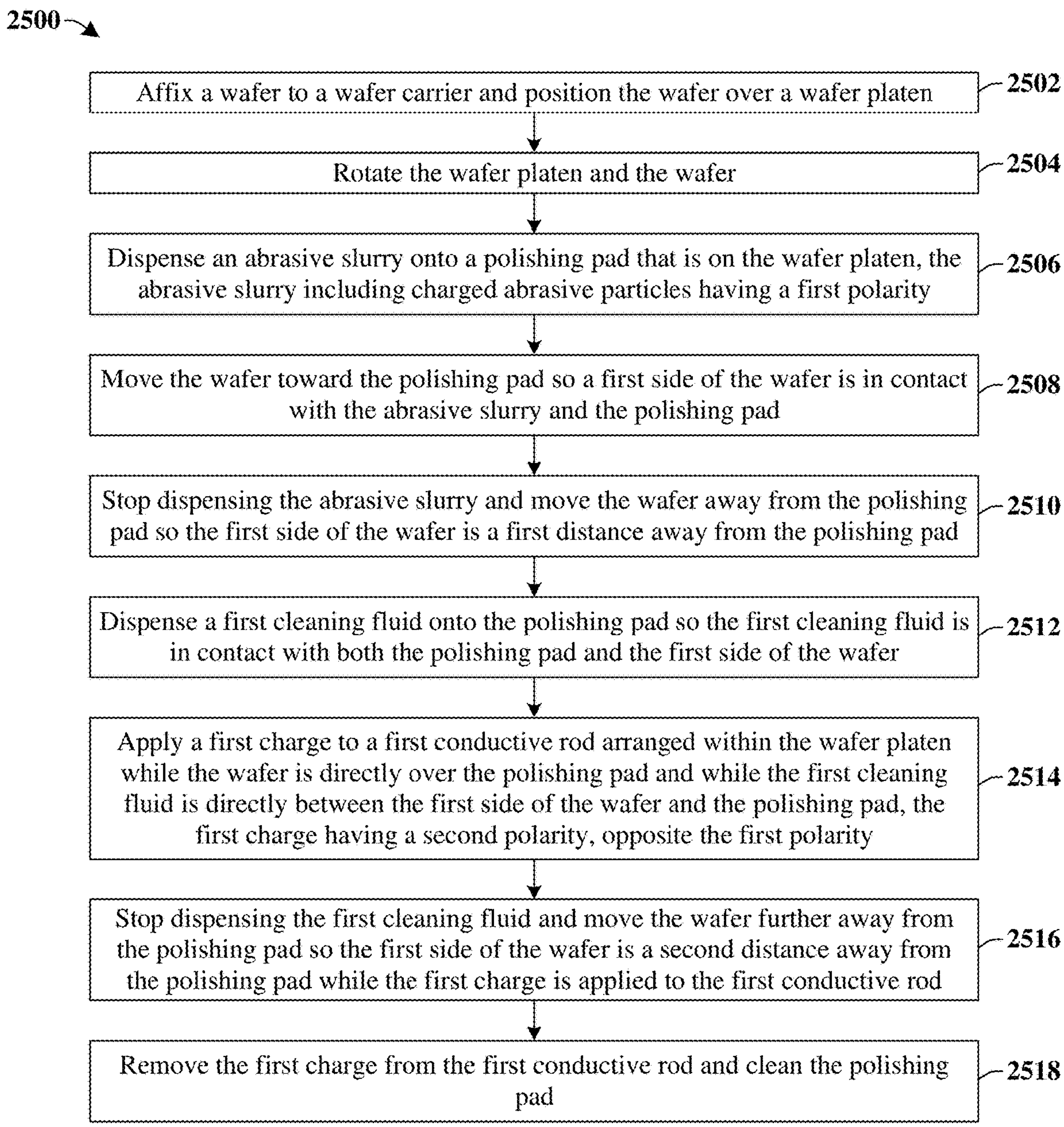
2500
Affix a wafer to a wafer carrier and position the wafer over a wafer platen
2502
Rotate the wafer platen and the wafer
2504
Dispense an abrasive slurry onto a polishing pad that is on the wafer platen, the abrasive slurry including charged abrasive particles having a first polarity
2506
Move the wafer toward the polishing pad so a first side of the wafer is in contact with the abrasive slurry and the polishing pad
2508
Stop dispensing the abrasive slurry and move the wafer away from the polishing pad so the first side of the wafer is a first distance away from the polishing pad
2510
Dispense a first cleaning fluid onto the polishing pad so the first cleaning fluid is in contact with both the polishing pad and the first side of the wafer
2512
Apply a first charge to a first conductive rod arranged within the wafer platen while the wafer is directly over the polishing pad and while the first cleaning fluid is directly between the first side of the wafer and the polishing pad, the first charge having a second polarity, opposite the first polarity
2514
Stop dispensing the first cleaning fluid and move the wafer further away from the polishing pad so the first side of the wafer is a second distance away from the polishing pad while the first charge is applied to the first conductive rod
2516
Remove the first charge from the first conductive rod and clean the polishing pad
2518

Fig. 25

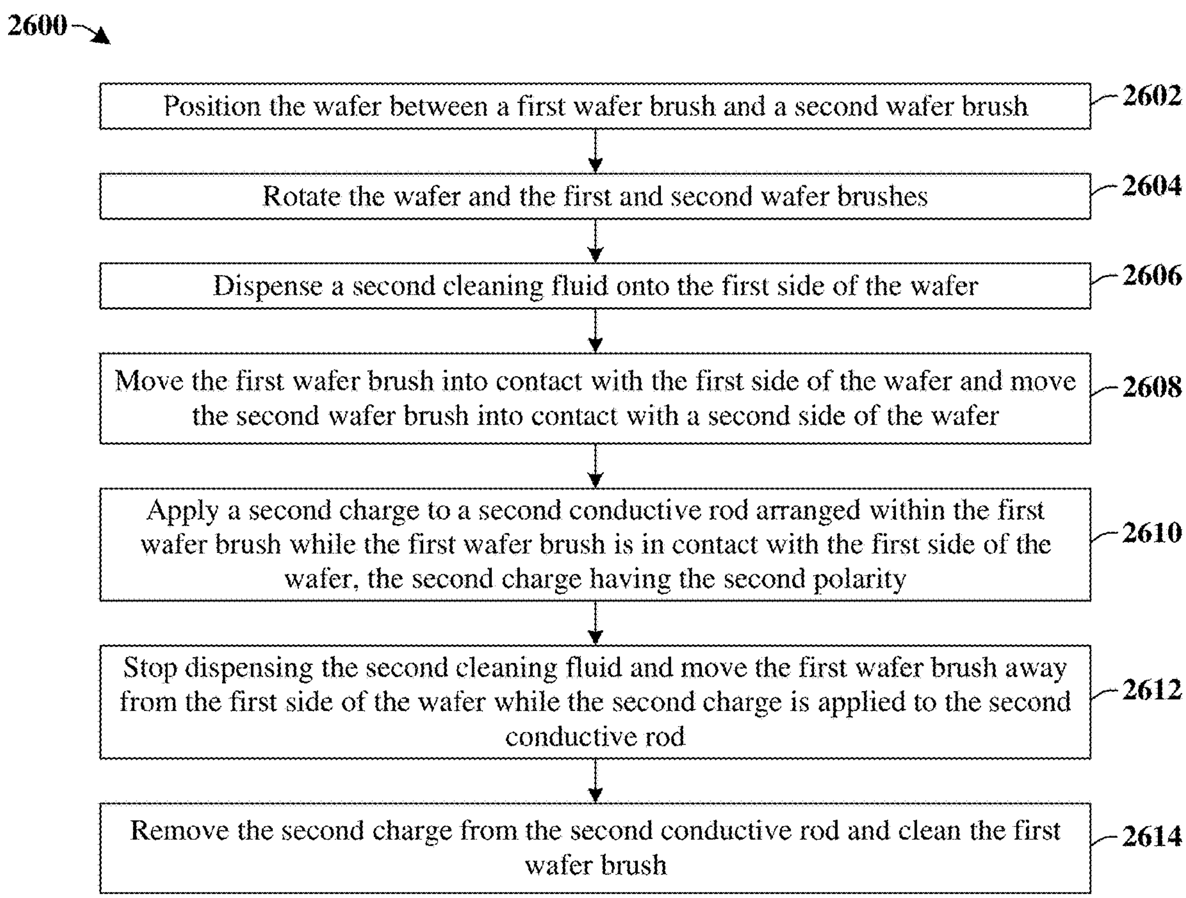
2600
Position the wafer between a first wafer brush and a second wafer brush
2602
Rotate the wafer and the first and second wafer brushes
2604
Dispense a second cleaning fluid onto the first side of the wafer
2606
Move the first wafer brush into contact with the first side of the wafer and move the second wafer brush into contact with a second side of the wafer
2608
Apply a second charge to a second conductive rod arranged within the first wafer brush while the first wafer brush is in contact with the first side of the wafer, the second charge having the second polarity
2610
Stop dispensing the second cleaning fluid and move the first wafer brush away from the first side of the wafer while the second charge is applied to the second conductive rod
2612
Remove the second charge from the second conductive rod and clean the first wafer brush
2614

Fig. 26

ELECTRICAL CLEANING TOOL FOR WAFER POLISHING TOOL SYSTEM

BACKGROUND

During manufacturing of semiconductor devices, various features are sequentially formed on a wafer resulting in an increasingly non-planar surface of the wafer. Such a non-planar surface is planarized to improve quality and/or uniformity of features subsequently formed on the wafer. Chemical mechanical polishing (CMP) is a wafer processing technique that is used to planarize surfaces of wafers. A CMP process removes excess materials, such as dielectric and/or conductive layers, from a surface of a wafer. The planarization operation can leave contaminants, such as residues of the removed materials, on the planarized surface.

BRIEF DESCRIPTION OF THE DRAWINGS

Aspects of the present disclosure are best understood from the following detailed description when read with the accompanying figures. It is noted that, in accordance with the standard practice in the industry, various features are not drawn to scale. In fact, the dimensions of the various features may be arbitrarily increased or reduced for clarity of discussion.

FIG. **1**A illustrates a cross-sectional view of some embodiments of an process tool comprising a first conductive rod disposed within a wafer platen.

FIG. **1**B illustrates a cross-sectional view of some embodiments of a process tool comprising a second conductive rod disposed within a first wafer brush.

FIG. **2** illustrates a top view of some embodiments of a process tool system comprising a plurality of process tool components for polishing a wafer.

FIG. **3**A illustrates a cross-sectional view of some embodiments of the process tool of FIG. **1**A in which first dielectric films surround the first conductive rods.

FIG. **3**B illustrates a top view of some embodiments of the process tool of FIG. **3**A.

FIG. **4**A illustrates a top view of some embodiments of the process tool of FIG. **3**B in which the first conductive rods are positively charged.

FIG. **4**B illustrates a top view of some embodiments of the process tool of FIG. **3**B in which the first conductive rods are negatively charged.

FIG. **5** illustrates a top view of some embodiments of the process tool of FIG. **3**B in which the first controller is coupled to the first voltage supply.

FIG. **6**A illustrates a cross-sectional view of some embodiments of the process tool of FIG. **1**A in which a single first conductive rod is disposed within the wafer platen.

FIG. **6**B illustrates a top view of some embodiments of the process tool of FIG. **6**A.

FIG. **7**A illustrates a top view of some embodiments of the process tool of FIG. **6**B in which the first conductive rod is positively charged.

FIG. **7**B illustrates a top view of some embodiments of the process tool of FIG. **6**B in which the first conductive rod is negatively charged.

FIG. **8** illustrates a top view of some embodiments of the process tool of FIG. **6**B in which the first controller is coupled to the first voltage supply.

FIG. **9**A and FIG. **9**B illustrate cross-sectional views of some embodiments of the process tool of FIG. **1**B in which a second dielectric film surrounds the second conductive rod.

FIG. **10**A illustrates a top view of some embodiments of the process tool of FIG. **9**B in which the second conductive rod is positively charged.

FIG. **10**B illustrates a top view of some embodiments of the process tool of FIG. **9**B in which the second conductive rod is negatively charged.

FIG. **11** illustrates a top view of some embodiments of the process tool of FIG. **9**B in which the second controller is coupled to the second voltage supply.

FIG. **12**A illustrates a top view of some other embodiments of the process tool of FIG. **9**B in which the second conductive rod is positively charged.

FIG. **12**B illustrates a top view of some other embodiments of the process tool of FIG. **9**B in which the second conductive rod is negatively charged.

FIG. **13** illustrates a top view of some other embodiments of the process tool of FIG. **9**B in which the second controller is coupled to the second voltage supply.

FIG. **14**A, FIG. **14**B, and FIG. **14**C illustrate cross-sectional views of some embodiments of the process tool of FIG. **9**A and FIG. **9**B in which a tube having a cavity therein is disposed within the second conductive rod.

FIGS. **15**A, **16**A, **17**A, **18**A, **19**A, **20**A, **21**A, **22**A, **23**A, **24**A illustrate cross-sectional views and FIGS. **15**B, **16**B, **17**B, **18**B, **19**B, **20**B, **21**B, **22**B, **23**B, **24**B illustrate corresponding three-dimensional views of some embodiments of an method for polishing a wafer and removing charged particles from the wafer after the polishing.

FIG. **25** illustrates a flow diagram of some embodiments of a method for polishing a wafer and performing a first wafer cleaning process after the polishing process.

FIG. **26** illustrates a flow diagram of some embodiments of a method for performing a second wafer cleaning process after the polishing process.

DETAILED DESCRIPTION

The following disclosure provides many different embodiments, or examples, for implementing different features of the provided subject matter. Specific examples of components and arrangements are described below to simplify the present disclosure. These are, of course, merely examples and are not intended to be limiting. For example, the formation of a first feature over or on a second feature in the description that follows may include embodiments in which the first and second features are formed in direct contact, and may also include embodiments in which additional features may be formed between the first and second features, such that the first and second features may not be in direct contact. In addition, the present disclosure may repeat reference numerals and/or letters in the various examples. This repetition is for the purpose of simplicity and clarity and does not in itself dictate a relationship between the various embodiments and/or configurations discussed.

Further, spatially relative terms, such as "beneath," "below," "lower," "above," "upper" and the like, may be used herein for ease of description to describe one element or feature's relationship to another element(s) or feature(s) as illustrated in the figures. The spatially relative terms are intended to encompass different orientations of the device in use or operation in addition to the orientation depicted in the figures. The apparatus may be otherwise oriented (rotated 90 degrees or at other orientations) and the spatially relative descriptors used herein may likewise be interpreted accordingly.

During integrated chip fabrication, semiconductor wafers often undergo one or more polishing or planarization processes. For example, in some fabrication processes, one or more layers (e.g., dielectric layers, metal layers, semiconductor layers, or some other suitable layers) are deposited over a substrate of a wafer and the layers are subsequently polished and/or planarized using a chemical mechanical polishing (CMP) process or the like. In some CMP processes, a wafer is attached to a wafer carrier and the wafer is positioned over a wafer platen. The wafer and the wafer platen are rotated and a first side of the wafer is brought into contact with a polishing pad that is disposed on a top surface of the platen. An abrasive slurry is dispensed onto the polishing pad to create or increase abrasion between the polishing pad and the first side of the wafer to polish the first side of the wafer. The abrasive slurry includes charged abrasive particles having a first polarity (e.g., a positive electric charge polarity or a negative electric charge polarity).

A challenge with some of these chemical mechanical polishing processes is that after the polishing of the wafer with the abrasive slurry, some of the charged particles from the abrasive slurry may remain along the polished first side of the wafer. For example, the charged abrasive particles may have a negative charge polarity and a first layer along the first side of the wafer may have a positive charge polarity. After the polishing of the first layer, some of the charged abrasive particles may remain on the first layer due to an attractive electrostatic force between the negatively charged abrasive particles and the positively charged first layer. These charged abrasive particles may form defects along the first side of the wafer which may render the wafer defective. Thus, a yield of the wafer fabrication process may be reduced.

Various embodiments of the present disclosure are related to a process tool and a method for removing charged abrasive particles from a wafer after polishing the wafer to reduce defects along the wafer after the polishing. For example, a first wafer cleaning process is performed on the wafer after the polishing. The first wafer cleaning process includes providing a first cleaning fluid to the wafer. A first conductive rod is disposed within a wafer platen and a first charge is applied to the first conductive rod during the first wafer cleaning process. The first charge has a polarity which is opposite the polarity of the charged abrasive particles used during the polishing. Thus, by applying the first charge to the first conductive rod during the first cleaning process, an attractive electrostatic force is created between the first conductive rod and charged abrasive particles on the wafer. The charged abrasive particles may be pulled toward the wafer platen and away from the wafer due to the electrostatic force. As a result, a number of charged abrasive particles on the wafer after the first cleaning process may be reduced.

Further, a second wafer cleaning process is performed on the wafer. The second wafer cleaning process includes providing a second cleaning fluid to the wafer and bringing a first wafer brush into contact with the wafer. A second conductive rod is disposed within a first wafer brush and a second charge is applied to the second conductive rod during the second cleaning process. The polarity of the second charge also is also opposite the polarity of the charged abrasive particles. Thus, by applying the second charge to the second conductive rod during the second cleaning process, an attractive electrostatic force is created between the second conductive rod and charged abrasive particles on the wafer. The charged abrasive particles are pulled toward the wafer brush and away from the wafer due to the electrostatic force. As a result, a number of charged abrasive particles on the wafer after the second cleaning process may be reduced.

Thus, by arranging the first and second conductive rods in the wafer platen and the first wafer brush, respectively, and by applying the first and second charges to the first and second conductive rods during the first and second cleaning processes, respectively, a likelihood of defects existing along the wafer after the polishing may be reduced. As a result, a yield of serviceable wafers may be improved.

FIG. **1**A illustrates a cross-sectional view **100***a* of some embodiments of an process tool comprising a first conductive rod **120** disposed within a wafer platen **116**.

A wafer **102** is held by a wafer carrier **114** over a wafer platen **116**. In some embodiments, the wafer includes a semiconductor substrate **104** and semiconductor devices **106** disposed along the semiconductor substrate **104**. Further, a first dielectric layer **108** is disposed along the semiconductor substrate **104**, conductive interconnects **110** are disposed within the first dielectric layer **108**, and a second dielectric layer **112** is disposed along the first dielectric layer **108**.

In some embodiments, the wafer **102** (e.g., a first side of the wafer **102**) can be polished by rotating the wafer **102** and bringing the wafer **102** into contact with a polishing pad **118** that is on a top surface of the platen **116**. Further, an abrasive slurry comprising charged abrasive particles **128** is provided between the polishing pad **118** and the wafer **102** to polish the wafer **102** using chemical and mechanical abrasion. For example, in some embodiments, the second dielectric layer **112** (or some other layer of the wafer **102**) is polished. In some instances, one or more of the charged abrasive particles **128** may remain on the wafer **102** after the polishing. For example, in some embodiments, the charged abrasive particles **128** have a first electric charge (e.g., a negative electric charge) and the second dielectric layer **112** has a second electric charge (e.g., a positive electric charge) having an opposite polarity as the first electric charge. As a result, an attractive electrostatic force exists between the second dielectric layer **112** and the charged abrasive particles **128**. Thus, after the polishing, one or more of the charged abrasive particles **128** may remain on the wafer **102** after the polishing due to the attractive electrostatic force.

After the wafer **102** is polished, a first cleaning process is performed to remove debris and/or charged abrasive particles **128** from the wafer **102**. For example, the rotating wafer **102** is raised above the polishing pad **118** and a first charge is applied to the first conductive rod **120** disposed within the platen **116**. For example, the first conductive rod **120** is coupled to a first voltage supply **122** (e.g., by one or more wires **124**, **126**) and the first voltage supply **122** applies the first charge to the first conductive rod **120**. The first charge has a polarity opposite the polarity of the charged abrasive particles **128** (e.g., as illustrated by charges **130**). Thus, during the first cleaning process, an electrostatic force exists between the first conductive rod **120** and the charged abrasive particles **128**. By controlling the first charge, the electrostatic force between the first conductive rod **120** and the charged abrasive particles **128** can be made greater than the electrostatic force between the second dielectric layer **112** and the charged abrasive particles **128**. As a result, the charged abrasive particles **128** can be pulled toward the first conductive rod **120** and away from the wafer **102** (e.g., as illustrated by arrows **129**). Thus, by including the first conductive rod **120** in the platen **116** and by applying the first charge to the first conductive rod **120** during the first cleaning process, a number of charged abrasive particles **128** on the wafer **102** can be reduced. Thus, a likelihood of defects existing along the wafer **102** after the polishing may be reduced and hence a wafer yield may be improved.

FIG. **1**B illustrates a cross-sectional view **100***b* of some embodiments of a process tool comprising a second conductive rod **138** disposed within a first wafer brush **132**.

The wafer **102** is arranged on one or more wafer rollers **156** and adjacent to the first wafer brush **132**. The wafer rollers **156** support the wafer **102**. In some embodiments, the first wafer brush **132** includes a brush shaft **134** and a plurality of protrusions **136** along the exterior of the brush shaft **134**.

A second cleaning process is performed on the wafer **102** to remove debris and/or abrasive particles **128** from the wafer **102**. For example, the wafer **102** is rotated (e.g., by the wafer roller(s) **156**) and the first wafer brush **132** is rotated. Further, a second charge is applied to the second conductive rod **138** disposed within the first wafer brush **132**. For example, the second conductive rod **138** is coupled to a second voltage supply **140** (e.g., by one or more wires **142**, **144**) and the second voltage supply **140** applies the second charge to the second conductive rod **138**. The second charge has a polarity opposite the polarity of the charged abrasive particles **128** (e.g., as illustrated by charges **152**). Thus, during the second cleaning process, an electrostatic force exists between the second conductive rod **138** and the charged abrasive particles **128**. By controlling the second charge, the electrostatic force between the second conductive rod **138** and the charged abrasive particles **128** can be made greater than the electrostatic force between the second dielectric layer **112** and the charged abrasive particles **128**. As a result, the charged abrasive particles **128** can be pulled toward the second conductive rod **138** and away from the wafer **102** (e.g., as illustrated by arrows **154**). Thus, by including the second conductive rod **138** in the first wafer brush **132** and by applying the second charge to the second conductive rod **138** during the second cleaning process, a number of charged abrasive particles **128** on the wafer **102** can be reduced. Thus, a likelihood of defects existing along the wafer **102** after the second cleaning process may be reduced and hence a wafer yield may be further improved.

The charged abrasive particles **128** may have a positive charge polarity or a negative charge polarity. Further, the layer being polished (e.g., the second dielectric layer **112**) or some other layer of the wafer **102** may have a positive charge polarity or a negative charge polarity. In some embodiments, the charged abrasive particles **128** may, for example, comprise silicon dioxide, aluminum oxide, or some other suitable materials. In some embodiments, the first dielectric layer **108** and/or the second dielectric layer **112** may, for example, comprise silicon dioxide, silicon nitride, aluminum oxide, or some other suitable material. In some embodiments, the conductive interconnects **110** may, for example, comprise copper, aluminum, tungsten, or some other suitable material. In some embodiments, the first conductive rod(s) **120** and/or the second conductive rod **138** may, for example, comprise copper, aluminum, or some other suitable material. In some embodiments, the first voltage supply **122** and the second voltage supply **140** are direct current (DC) voltage supplies. In some embodiments, the semiconductor devices **106** may, for example, be or comprise transistor devices or some other suitable semiconductor devices.

FIG. **2** illustrates a top view **200** of some embodiments of a process tool system comprising a plurality of process tool components for polishing a wafer **102**.

The process tool system includes a polishing module **202**, a mega-sonic module **204**, a brushing module **206**, and loading modules **208**. A wafer transport robot **210** is configured to move along a transport path **212** to transport the wafer **102** between the modules **202**, **204**, **206**, **208**.

The polishing module **202** includes the wafer platen **116** and the polishing pad **118** on the wafer platen **116**. The wafer carrier **114** is over the wafer platen **116**. A pad conditioner **214** for conditioning the polishing pad **118** is over the wafer platen **116**. In some embodiments, the pad conditioner **214** may be or comprise a diamond disk. In some embodiments, the pad conditioner **214** is affixed to a conditioner arm **216**. A slurry dispenser **218** is over the platen **116**. The slurry dispenser **218** comprises one or more nozzles **220** along a slurry arm **222**.

The one or more first conductive rods **120** are disposed within the platen **116**. The first conductive rods **120** are coupled to the first voltage supply **122**. In some embodiments, a first controller **224** is coupled to the first voltage supply **122**. The first controller **224** is configured to control the first voltage supply **122**. For example, the first controller **224** is configured to control a voltage level of the first voltage supply **122**, a polarity of the first voltage supply **122**, and a switching (e.g., ON or OFF) of the first voltage supply **122**. In some embodiments, the first controller **224** comprises processing circuitry.

The mega-sonic module **204** includes a primary tank **226** and an overflow tank **228**. Wafer rollers **230** are disposed within the primary tank **226** and are configured to hold and rotate the wafer **102** over a transducer **232**. In some embodiments, the primary tank **226** includes an inlet **234** and an outlet **236**.

The brushing module **206** includes the first wafer brush **132** and the wafer roller (e.g., **156** of FIG. **1**B). In some embodiments, the brushing module **206** further includes a second wafer brush **248**, a first spray bar **238**, and a second spray bar **240**. The first wafer brush **132** is configured to clean a first side of a wafer **102** and the second wafer brush **248** is configured to clean a second side of the wafer **102**. The second wafer brush **248** has a second shaft (not labeled) and second protrusions (not labeled). The first spray bar **238** is configured to dispense the second cleaning fluid from first nozzles **242** onto the first side of the wafer **102** and the second spray bar **240** is configured to dispense the second cleaning fluid from second nozzles **244** onto the second side of the wafer **102**.

The second conductive rod **138** is disposed within the first wafer brush **132**. In some embodiments, a second controller **246** is coupled to the second voltage supply **140**. The second controller **246** is configured to control the second voltage supply **140**. For example, the second controller **246** is configured to control a voltage level of the second voltage supply **140**, a polarity of the second voltage supply **140**, and a switching of the second voltage supply **140**. In some embodiments, the second controller **246** comprises processing circuitry.

FIG. **3**A illustrates a cross-sectional view **300***a* of some embodiments of the process tool of FIG. **1**A in which first dielectric films **302** surround the first conductive rods **120**. FIG. **3**B illustrates a top view **300***b* of some embodiments of the process tool of FIG. **3**A. In some embodiments, cross-sectional view **300***a* of FIG. **3**A may, for example, be taken across line A-A' of FIG. **3**B and/or top view **300***b* of FIG. **3**B may be taken across line A-A' of FIG. **3**A.

In some embodiments, the first dielectric films **302** separate the first conductive rods **120** from the wafer platen **116**. For example, in some embodiments, the first conductive rods **120** comprise a first conductive material, the wafer platen **116** comprises a second conductive material, and the first dielectric films **302** electrically isolate the first conductive rods **120** from the wafer platen **116**.

In some embodiments, the first conductive rod(s) **120** are coupled to a first terminal **122***a* and a second terminal **122***b* of the first voltage supply **122** by a first wire **124** and a second wire **126**, respectively. In some embodiments, the first conductive rods **120** are coupled in parallel to the first voltage supply **122**. For example, in some embodiments, first ends of the first conductive rods **120** are coupled to the first terminal **122***a* of the first voltage supply **122** via the first wire **124** and second ends of the first conductive rods **120** are coupled to the second terminal **122***b* of the first voltage supply **122** via the second wire **126**. In some other embodiments (e.g., as illustrated in FIGS. **6**A, **6**B), the second terminal **122***b* of the first voltage supply **122** is coupled to the first conductive rods **120** by the second wire **126** and the first terminal **122***a* of the first voltage supply **122** is coupled to ground (e.g., **402** of FIGS. **4**A, **4**B) by the first wire **124**.

In some embodiments, some first conductive rods **120** have different lengths than other first conductive rods **120**. In some embodiments, the first conductive rods **120** are substantially parallel to one another. In some other embodiments, the first conductive rods **120** may have a spiral shape or some other suitable shape.

FIG. **4**A illustrates a top view **400***a* of some embodiments of the process tool of FIG. **3**B in which the first conductive rods **120** are positively charged.

In some embodiments, the first terminal **122***a* of the first voltage supply **122** is the negative terminal of the first voltage supply **122** and the second terminal **122***b* of the first voltage supply **122** is the positive terminal of the first voltage supply **122**. Further, the first terminal **122***a* and the first wire **124** are coupled to ground **402**. Thus, the first conductive rods **120** may be positively charged (e.g., relative to ground **402**). For example, the voltage across the first voltage supply **122** may be set to a first positive voltage (e.g., approximately 5 volts or some other suitable value). Thus, the voltage at the second terminal **122***b* is approximately equal to the first positive voltage (e.g., 5 volts) and the voltage at the first terminal **122***a* is approximately zero volts because the first terminal **122***a* is coupled to ground **402**. The first wire **124** and the second wire **126** may have resistances while resistances of the first conductive rods **120** may be approximately zero. Thus, a first voltage drop (e.g., approximately 2.5 volts) may occur across the second wire **126** due to the resistance of the second wire **126**, approximately zero voltage drop may occur across the first conductive rods **120**, and a second voltage (e.g., approximately 2.5 volts) drop may occur across the first wire **124** due to the resistance of the first wire **124**. Thus, the voltage at the first conductive rods **120** is positive (e.g., approximately 2.5 volts) and hence the first conductive rods are positively charged.

FIG. **4**B illustrates a top view **400***b* of some embodiments of the process tool of FIG. **3**B in which the first conductive rods **120** are negatively charged.

In some embodiments, the second terminal **122***b* and the second wire **126** are coupled to ground **402**. Thus, the first conductive rods **120** may be negatively charged (e.g., relative to ground **402**). For example, the voltage across the first voltage supply **122** may be set to the first positive voltage (e.g., approximately 5 volts or some other suitable value). Thus, the voltage at the first terminal **122***a* is approximately equal to the negation of the first positive voltage (e.g., −5 volts) and the voltage at the second terminal is approximately zero volts because the second terminal **122***b* is coupled to ground **402**. A first voltage drop (e.g., approximately 2.5 volts) may occur across the second wire **126** due to the resistance of the second wire **126**, approximately zero voltage drop may occur across the first conductive rods **120**, and a second voltage drop (e.g., approximately 2.5 volts) may occur across the first wire **124** due to the resistance of the first wire **124**. Thus, the voltage at the first conductive rods **120** is negative (e.g., approximately −2.5 volts) and hence the first conductive rods are negatively charged.

FIG. **5** illustrates a top view **500** of some embodiments of the process tool of FIG. **3**B in which the first controller **224** is coupled to the first voltage supply **122**.

In some embodiments, the first controller **224** has an input **224***a* coupled to a first input terminal **502** and an output **224***b* coupled to a first control terminal **504**. In some embodiments, the first voltage supply **122** includes a first voltage source **506** (e.g., a first DC voltage source) having a positive terminal **506***a* and a negative terminal **506***b*. The positive terminal **506***a* is coupled to the second terminal **122***b* of the first voltage supply **122** and the negative terminal **506***b* is coupled to the first terminal **122***a* of the first voltage supply **122**. In some embodiments, the first voltage supply **122** further includes a first switch **508** and a second switch **510**. The first switch **508** selectively couples the negative terminal **506***b* to ground **402**. The second switch **510** selectively couples the positive terminal **506***a* to ground **402**.

In some embodiments, the first voltage source **506**, the first switch **508**, and the second switch **510** are controlled by the first control terminal **504** of the first controller **224**. For example, the first control terminal **504** may include a first wire (not shown) coupled to a control terminal (not shown) of the first voltage source **506** and a second wire (not shown) coupled to both a control terminal (not shown) of the first switch **508** and a control terminal (not shown) of the second switch **510**. The first controller **224** is configured to control the voltage (e.g., voltage magnitude) across the first voltage source **506**, the state (e.g., ON or OFF) of the first switch **508**, and the state of the second switch **510** via the first control terminal **504**. For example, the first controller **224** may set the voltage across the first voltage source **506** to some voltage within a range from about 0.5 to 100 volts or some other suitable range. Further, to positively charge the first conductive rods **120**, the first controller **224** may close (e.g., turn ON) the first switch **508** and open (e.g., turn OFF) the second switch **510**, thereby coupling the negative terminal **506***b* to ground **402** (e.g., as shown in FIG. **4**A). Conversely, to negatively charge the first conductive rods **120**, the first controller **224** may open (e.g., turn OFF) the first switch **508** and close (e.g., turn ON) the second switch **510**, thereby coupling the positive terminal **506***a* to ground **402** (e.g., as shown in FIG. **4**B).

The first controller **224** may set the voltage of the first voltage source **506** and the switching of the first and second switches **508**, **510** based on a signal at the first input terminal **502** (e.g., a user input signal, an automated input signal, or the like). For example, if a slurry having negatively charged abrasive particles is used during polishing, that information may be provided to the first controller **224** via the first input terminal **502**. The first controller **224** can then control the voltage of the first voltage source **506** and the switching of the first and second switches **508**, **510** so the first conductive rods **120** are positively charged to remove the negatively charged abrasive particles during the first cleaning process.

FIG. **6**A illustrates a cross-sectional view **600***a* of some embodiments of the process tool of FIG. **1**A in which a single first conductive rod **120** is disposed within the wafer platen **116**. FIG. **6**B illustrates a top view **600***b* of some embodiments of the process tool of FIG. **6**A. In some embodiments, cross-sectional view **600***a* of FIG. **6**A may, for example, be taken across line B-B' of FIG. **6**B and/or top view **600***b* of FIG. **6**B may be taken across line A-A' of FIG. **6**A.

In some embodiments, the first conductive rod **120** is plate-shaped and continuously extends along a perimeter of the wafer platen **116**. In some embodiments, the second terminal **122***b* of the first voltage supply **122** is coupled to the first conductive rod **120** by the second wire **126** and the first terminal **122***a* of the first voltage supply **122** is coupled to ground **402** by the first wire **124**. In some other embodiments (e.g., as illustrated in FIGS. **3**A, **3**B), a first side of the first conductive rod **120** is coupled to the first terminal **122***a* of the first voltage supply **122** via the first wire **124** and a second side of the first conductive rod **120** is coupled to the second terminal **122***b* of the first voltage supply **122** via the second wire **126**.

FIG. **7**A illustrates a top view **700***a* of some embodiments of the process tool of FIG. **6**B in which the first conductive rod **120** is positively charged.

In some embodiments, the first terminal **122***a* of the first voltage supply **122** is the negative terminal of the first voltage supply **122** and the second terminal **122***b* of the first voltage supply **122** is the positive terminal of the first voltage supply **122**. Further, the first terminal **122***a* is coupled to ground **402**. Thus, the first conductive rod **120** may be positively charged (e.g., relative to ground **402**). For example, the voltage across the first voltage supply **122** may be set to a first positive voltage (e.g., approximately 5 volts or some other suitable value). Thus, the voltage at the second terminal **122***b* is approximately equal to the first positive voltage (e.g., 5 volts) and the voltage at the first terminal **122***a* is approximately zero volts because the first terminal **122***a* is coupled to ground **402**. As a result, the voltage at the first conductive rod **120** is positive (e.g., approximately 5 volts) and hence the first conductive rod **120** is positively charged.

FIG. **7**B illustrates a top view **700***b* of some embodiments of the process tool of FIG. **6**B in which the first conductive rod **120** is negatively charged.

In some embodiments, the first terminal **122***a* of the first voltage supply **122** is the positive terminal of the first voltage supply **122** and the second terminal **122***b* of the first voltage supply **122** is the negative terminal of the first voltage supply **122**. Further, the first terminal **122***a* is coupled to ground **402**. Thus, the first conductive rod **120** may be negatively charged (e.g., relative to ground **402**). For example, the voltage across the first voltage supply **122** may be set to a first positive voltage (e.g., approximately 5 volts or some other suitable voltage). Thus, the voltage at the second terminal **122***a* is approximately equal to the negation of the first positive voltage (e.g., −5 volts) and the voltage at the first terminal **122***a* is approximately zero volts because the first terminal **122***a* is coupled to ground **402**. As a result, the voltage at the first conductive rod **120** is negative (e.g., approximately −5 volts) and hence the first conductive rod **120** is negatively charged.

FIG. **8** illustrates a top view **800** of some embodiments of the process tool of FIG. **6**B in which the first controller **224** is coupled to the first voltage supply **122**.

In some embodiments, the second terminal **122***b* is coupled to the first conductive rod **120**. In some embodiments, the first voltage supply **122** includes a first switch **802**, a second switch **804**, a third switch **806**, and a fourth switch **808**. The first switch **802** selectively couples the negative terminal **506***b* of the first voltage source **506** to the first conductive rod **120** (e.g., via the second terminal **122***b*). The second switch **804** selectively couples the positive terminal **506***a* of the first voltage source **506** to the first conductive rod **120**. The third switch **806** selectively couples the negative terminal **506***b* of the first voltage source **506** to ground **402**. The fourth switch **808** selectively couples the positive terminal **506***a* of the first voltage source **506** to ground **402**.

In some embodiments, the first voltage source **506**, the first switch **802**, the second switch **804**, the third switch **806**, and the fourth switch **808** are controlled by the first control terminal **504** of the first controller **224**. For example, the first control terminal **504** may include a first wire (not shown) coupled to a control terminal (not shown) of the first voltage source **506**. Further, the first control terminal **504** may include a second wire (not shown) coupled to a control terminal (not shown) of the first switch **802**, a control terminal (not shown) of the second switch **804**, a control terminal (not shown) of the third switch **806**, and a control terminal (not shown) of the fourth switch **808**. The first controller **224** is configured to control the voltage (e.g., voltage magnitude) across the first voltage source **506** and the states (e.g., ON or OFF) of the switches **802**, **804**, **806**, **808** via the first control terminal **504**. For example, the first controller **224** may set the voltage across the first voltage source **506**. Further, to positively charge the first conductive rod(s) **120**, the first controller **224** may open (e.g., turn OFF) the first switch **802**, close (e.g., turn ON) the second switch **804**, close the third switch **806**, and open the fourth switch **808**, thereby coupling the positive terminal **506***a* to the first conductive rod **120** and the negative terminal **506***b* to ground **402** (e.g., as shown in FIG. **7**A). Conversely, to negatively charge the first conductive rod(s) **120**, the first controller **224** may close (e.g., turn ON) the first switch **802**, open (e.g., turn OFF) the second switch **804**, open the third switch **806**, and close the fourth switch **808**, thereby coupling the negative terminal **506***b* to the first conductive rod **120** and the positive terminal **506***a* to ground **402** (e.g., as shown in FIG. **7**B).

FIG. **9**A and FIG. **9**B illustrate cross-sectional views **900***a*, **900***b* of some embodiments of the process tool of FIG. **1**B in which a second dielectric film **902** surrounds the second conductive rod **138**. In some embodiments, cross-sectional view **900***a* of FIG. **9**A may, for example, be taken across line C-C' of FIG. **9**B and/or cross-sectional view **900***b* of FIG. **9**B may be taken across line C-C' of FIG. **9**A.

In some embodiments, the second dielectric film **902** separates the second conductive rod **138** from the brush shaft **134**. In some other embodiments (e.g., as shown in FIG. **1**B), the second conductive rod **138** is in direct contact with the brush shaft **134**. The second conductive rod **138** extends through a center of the first wafer brush **132** from a first end of the first wafer brush **132** to a second end of the first wafer brush **132**, opposite the first end. In some embodiments, the second conductive rod **138** is coupled to a first terminal **140***a* and a second terminal **140***b* of the second voltage supply **140** by a first wire **142** and a second wire **144**, respectively. For example, in some embodiments, a first end of the second conductive rod **138** is coupled to the first terminal **140***a* of the second voltage supply **140** via the first wire **142** and a second end of the second conductive rod **138** is coupled to the second terminal **140***b* of the second voltage supply **140** via the second wire **144**.

FIG. **10**A illustrates a top view **1000***a* of some embodiments of the process tool of FIG. **9**B in which the second conductive rod **138** is positively charged.

In some embodiments, the first terminal **140***a* of the second voltage supply **140** is the negative terminal of the second voltage supply **140** and the second terminal **140***b* of the second voltage supply **140** is the positive terminal of the second voltage supply **140**. Further, the first terminal **140***a* and the first wire **142** are coupled to ground **402**. Thus, the second conductive rod **138** may be positively charged (e.g., relative to ground **402**). For example, the voltage across the second voltage supply **140** may be set to a first positive voltage (e.g., approximately 5 volts or some other suitable voltage). Thus, the voltage at the second terminal **140***b* is approximately equal to the first positive voltage (e.g., 5 volts) and the voltage at the first terminal **140***a* is approximately zero volts because the first terminal **140***a* is coupled to ground **402**. The first wire **142** and the second wire **144** may have resistances while resistances of the second conductive rod **138** may be approximately zero. Thus, a first voltage drop (e.g., approximately 2.5 volts) may occur across the second wire **144** due to the resistance of the second wire **144**, approximately zero voltage drop may occur across the second conductive rod **138**, and a second voltage drop (e.g., approximately 2.5 volts) may occur across the first wire **142** due to the resistance of the first wire **142**. Thus, the voltage at the second conductive rod **138** is positive (e.g., approximately 2.5 volts) and hence the second conductive rod **138** is positively charged.

FIG. **10**B illustrates a top view **1000***b* of some embodiments of the process tool of FIG. **9**B in which the second conductive rod **138** is negatively charged.

In some embodiments, the second terminal **140***b* and the second wire **144** are coupled to ground **402**. Thus, the second conductive rod **138** may be negatively charged (e.g., relative to ground **402**). For example, the voltage across the second voltage supply **140** may be set to the first positive voltage (e.g., approximately 5 volts or some other suitable voltage). Thus, the voltage at the first terminal **140***a* is approximately equal to the negation of the first positive voltage (e.g., −5 volts) and the voltage at the second terminal **140***b* is approximately zero volts because the second terminal **140***b* is coupled to ground **402**. A first voltage drop (e.g., approximately 2.5 volts) may occur across the second wire **144** due to the resistance of the second wire **144**, approximately zero voltage drop may occur across the second conductive rod **138**, and a second voltage drop (e.g., approximately 2.5 volts) may occur across the first wire **142** due to the resistance of the first wire **142**. Thus, the voltage at the second conductive rod **138** is negative (e.g., approximately −2.5 volts) and hence the second conductive rod is negatively charged.

FIG. **11** illustrates a top view **1100** of some embodiments of the process tool of FIG. **9**B in which the second controller **246** is coupled to the second voltage supply **140**.

In some embodiments, the second controller **246** has an input **246***a* coupled to a second input terminal **1102** and an output **246***b* coupled to a second control terminal **1104**. In some embodiments, the second voltage supply **140** includes a second voltage source **1106** (e.g., a second DC voltage source) having a positive terminal **1106***a* and a negative terminal **1106***b*. The positive terminal **1106***a* is coupled to the second terminal **140***b* of the second voltage supply **140** and the negative terminal **1106***b* is coupled to the first terminal **140***a* of the second voltage supply **140**. In some embodiments, the second voltage supply **140** further includes a first switch **1108** and a second switch **1110**. The first switch **1108** selectively couples the negative terminal **1106***b* to ground **402**. The second switch **1110** selectively couples the positive terminal **1106***a* to ground **402**.

In some embodiments, the second voltage source **1106**, the first switch **1108**, and the second switch **1110** are controlled by the second control terminal **1104** of the second controller **246**. For example, the second control terminal **1104** may include a first wire (not shown) coupled to a control terminal (not shown) of the second voltage source **1106** and a second wire (not shown) coupled to both a control terminal (not shown) of the first switch **1108** and a control terminal (not shown) of the second switch **1110**. The second controller **246** is configured to control the voltage (e.g., voltage magnitude or level) across the second voltage source **1106**, the state (e.g., ON or OFF) of the first switch **1108**, and the state of the second switch **1110** via the second control terminal **1104**. For example, the second controller **246** may set the voltage across the second voltage source **1106** to some voltage within a range from about 0.5 to 100 volts or some other suitable range. Further, to positively charge the second conductive rod **138**, the second controller **246** may close (e.g., turn ON) the first switch **1108** and open (e.g., turn OFF) the second switch **1110**, thereby coupling the negative terminal **1106***b* to ground **402** (e.g., as shown in FIG. **10**A). Conversely, to negatively charge the second conductive rod **138**, the second controller **246** may open (e.g., turn OFF) the first switch **1108** and close (e.g., turn ON) the second switch **1110**, thereby coupling the positive terminal **1106***a* to ground **402** (e.g., as shown in FIG. **4**B).

The second controller **246** may set the voltage of the second voltage source **1106** and the switching of the first and second switches **1108**, **1110** based on a signal at the second input terminal **1102** (e.g., a user input signal, an automated input signal, or the like). For example, if a slurry having negatively charged abrasive particles is used during the polishing, that information may be provided to the second controller **246** via the second input terminal **1102**. The second controller **246** can then control the voltage of the second voltage source **1106** and the switching of the first and second switches **1108**, **1110** so the second conductive rod **138** is positively charged to remove the negatively charged abrasive particles during the second cleaning process.

FIG. **12**A illustrates a top view **1200***a* of some other embodiments of the process tool of FIG. **9**B in which the second conductive rod **138** is positively charged.

In some embodiments, the first terminal **140***a* of the second voltage supply **140** is the negative terminal of the second voltage supply **140** and the second terminal **140***b* of the second voltage supply **140** is the positive terminal of the second voltage supply **140**. The first terminal **140***a* is coupled to ground **402** and the second terminal **140***b* is coupled to the second conductive rod **138**. Thus, the second conductive rod **138** may be positively charged (e.g., relative to ground **402**). For example, the voltage across the second voltage supply **140** may be set to a first positive voltage (e.g., approximately 5 volts or some other suitable value). Thus, the voltage at the second terminal **140***b* is approximately equal to the first positive voltage (e.g., 5 volts) and the voltage at the first terminal **140***a* is approximately zero volts because the first terminal **140***a* is coupled to ground **402**. As a result, the voltage at the second conductive rod **138** is positive (e.g., approximately 5 volts) and hence the second conductive rod **138** is positively charged.

FIG. **12**B illustrates a top view **1200***b* of some other embodiments of the process tool of FIG. **9**B in which the second conductive rod **138** is negatively charged.

In some embodiments, the first terminal **140***a* of the second voltage supply **140** is the positive terminal of the second voltage supply **140** and the second terminal **140***b* of the second voltage supply **140** is the negative terminal of the second voltage supply **140**. Thus, the second conductive rod **138** may be negatively charged (e.g., relative to ground **402**). For example, the voltage across the second voltage supply **140** may be set to the first positive voltage (e.g., approximately 5 volts or some other suitable value). Thus, the voltage at the second terminal **140***b* is approximately equal to the negation of the first positive voltage (e.g., −5 volts) and the voltage at the first terminal **140***a* is approximately zero volts because the first terminal **140***a* is coupled to ground **402**. As a result, the voltage at the second conductive rod **138** is negative (e.g., approximately −5 volts) and hence the second conductive rod **138** is negatively charged.

FIG. **13** illustrates a top view **1300** of some other embodiments of the process tool of FIG. **9**B in which the second controller **246** is coupled to the second voltage supply **140**.

In some embodiments, the second terminal **140***b* is coupled to the second conductive rod **138**. In some embodiments, the second voltage supply **140** includes a first switch **1302**, a second switch **1304**, a third switch **1306**, and a fourth switch **1308**. The first switch **1302** selectively couples the negative terminal **1106***b* of the second voltage source **1106** to the second conductive rod **138** (e.g., via the second terminal **140***b*). The second switch **1304** selectively couples the positive terminal **1106***a* of the second voltage source **1106** to the second conductive rod **138**. The third switch **1306** selectively couples the negative terminal **1106***b* to ground **402**. The fourth switch **1308** selectively couples the positive terminal **1106***a* to ground **402**.

In some embodiments, the second voltage source **1106**, the first switch **1302**, the second switch **1304**, the third switch **1306**, and the fourth switch **1308** are controlled by the second control terminal **1104** of the second controller **246**. For example, the second control terminal **1104** may include a first wire (not shown) coupled to a control terminal (not shown) of the second voltage source **1106**. Further, the second control terminal **1104** may include a second wire (not shown) coupled to a control terminal (not shown) of the first switch **1302**, a control terminal (not shown) of the second switch **1304**, a control terminal (not shown) of the third switch **1306**, and a control terminal (not shown) of the fourth switch **1308**. The second controller **246** is configured to control the voltage (e.g., voltage magnitude or level) across the second voltage source **1106** and the states (e.g., ON or OFF) of the switches **1302**, **1304**, **1306**, **1308** via the second control terminal **1104** to control the charge of the second conductive rod **138** (e.g., similar to how the first controller **224** controls the charge of the first conductive rod **120** in the embodiments illustrated in FIG. **8**). In some embodiments, any of the switches described herein may, for example, be or comprise transistor devices (e.g., bipolar junction transistors, metal-oxide-semiconductor field affect transistors, junction field effect transistors, or the like) or some other suitable devices.

FIG. **14**A, FIG. **14**B, and FIG. **14**C illustrate cross-sectional views **1400***a*, **1400***b*, **1400***c*, respectively, of some embodiments of the process tool of FIG. **9**A and FIG. **9**B in which a tube **1402** having a cavity **1404** therein is disposed within the second conductive rod **138**. In some embodiments, cross-sectional view **1400***a* of FIG. **14**A may, for example, be taken across line D-D' of FIG. **14**C and/or cross-sectional view **1400***c* of FIG. **14**C may be taken across line D-D' of FIG. **14**A. In some embodiments, cross-sectional view **1400***b* of FIG. **14**B may, for example, be taken across line E-E' of FIG. **14**C and/or cross-sectional view **1400***c* of FIG. **14**C may be taken across line E-E' of FIG. **14**B.

In some embodiments, the tube **1402** extends along the length of the second conductive rod **138**. The second conductive rod **138** surrounds portions of the tube **1402**. The tube **1402** may be configured to convey the second cleaning fluid along the first wafer brush **132**. For example, the cleaning fluid may be injected into the tube **1402** (e.g., into the cavity **1404** within the tube **1402**). The tube **1402** may have a plurality of openings **1406** along the first wafer brush **132** at the protrusions **136** of the first wafer brush **132**. The openings **1406** extend through openings in the second conductive rod **138**. The openings **1406** establish fluid communication between the cavity **1404** within the tube **1402** and an environment outside of the first wafer brush **132**. Thus, the second cleaning fluid may be dispensed via the openings in the tube **1402** during the second cleaning process.

FIGS. **15**A, **16**A, **17**A, **18**A, **19**A, **20**A, **21**A, **22**A, **23**A, **24**A illustrate cross-sectional views **1500***a*, **1600***a*, **1700***a*, **1800***a*, **1900***a*, **2000***a*, **2100***a*, **2200***a*, **2300***a*, **2400***a*, respectively, and FIGS. **15**B, **16**B, **17**B, **18**B, **19**B, **20**B, **21**B, **22**B, **23**B, **24**B illustrate corresponding three-dimensional views **1500***b*, **1600***b*, **1700***b*, **1800***b*, **1900***b*, **2000***b*, **2100***b*, **2200***b*, **2300***b*, **2400***b*, respectively, of some embodiments of an method for polishing a wafer **102** and removing charged particles from the wafer **102** after the polishing. Although FIGS. **15**A-**24**B are described in relation to a method, it will be appreciated that the structures disclosed in FIGS. **15**A-**24**B are not limited to such a method, but instead may stand alone as structures independent of the method.

As shown in cross-sectional view **1500***a* of FIG. **15**A and corresponding three-dimensional view **1500***b* of FIG. **15**B, the wafer **102** is attached to the wafer carrier **114** and positioned over the wafer platen **116** in the polishing chamber (e.g., **202** of FIG. **2**). For example, in some embodiments, the wafer **102** is moved to the polishing chamber (e.g., **202** of FIG. **2**) by the wafer transport robot (e.g., **210** of FIG. **2**). The wafer **102** and the wafer platen **116** are then rotated. In some embodiments, the wafer **102** and the wafer platen **116** are rotated in different directions (e.g., the wafer **102** is rotated clockwise and the wafer platen **116** is rotated counter clockwise). In some other embodiments, the wafer **102** and the wafer platen **116** are rotated in the same direction.

As shown in cross-sectional view **1600***a* of FIG. **16**A and corresponding three-dimensional view **1600***b* of FIG. **16**B, the abrasive slurry comprising the charged abrasive particles **128** is dispensed onto the polishing pad **118**. For example, in some embodiments, the abrasive slurry is dispensed from the nozzle **220** of the slurry dispenser **218** onto the polishing pad **118**. The charged abrasive particles **128** have a first polarity. For example, in some embodiments, the charged abrasive particles **128** are negatively charged.

As shown in cross-sectional view **1700***a* of FIG. **17**A and corresponding three-dimensional view **1700***b* of FIG. **17**B, a first side **102***a* of the wafer **102** is brought into contact with both the polishing pad **118** and the charged abrasive particles **128** that are on the polishing pad **118** to polish the first side **102***a* of the wafer **102**. For example, the second dielectric layer **112** of the wafer **102** is polished to thin (e.g., remove a portion of) the second dielectric layer **112**. In some embodiments, a downward force is applied on the wafer **102** to cause abrasion between the wafer **102** and the polishing pad **118**. The charged abrasive particles **128** of the abrasive slurry may aid in the polishing of the wafer **102** by increasing an abrasion between the wafer **102** and the polishing pad **118**. The polishing of the wafer **102** may be performed for a predetermined amount of time or until the desired amount of the wafer **102** (e.g., the desired amount of the second dielectric layer **112**) is polished.

As shown in cross-sectional view **1800***a* of FIG. **18**A and corresponding three-dimensional view **1800***b* of FIG. **18**B, the dispensing of the abrasive slurry is stopped and the wafer **102** is lifted a first distance **1802** away from the polishing pad **118**. In some instances, an electrostatic force may exist between the charged abrasive particles **128** and the wafer **102**. For example, the second dielectric layer **112** (or some other layer of the wafer **102**) may have a second polarity, opposite the first polarity. Thus, the charged abrasive particles **128** may be attracted to the second dielectric layer **112** due to the electrostatic force. As a result, the charged abrasive particles **128** may collect along the first side **102***a* of the wafer **102** after and/or during the polishing.

In some embodiments, the polishing process may result in the wafer **102** having substantially planar surface or surfaces. Thus, in some instances, the polishing process may alternatively be referred to as a planarization process.

As shown in cross-sectional view **1900***a* of FIG. **19**A and corresponding three-dimensional view **1900***b* of FIG. **19**B, a first cleaning fluid **1902** is dispensed onto the polishing pad **118** and a first charge having a second polarity, opposite the first polarity, is applied to the first conductive rod(s) **120** while the wafer **102** is the first distance **1802** from the polishing pad **118**. This may be referred to as a first wafer cleaning process. For example, the first cleaning fluid **1902** is dispensed from the nozzle **220** of the slurry dispenser **218** onto the polishing pad **118**. In some embodiments, the first cleaning fluid **1902** is in contact with both the polishing pad **118** and the wafer **102**. In some embodiments, the first distance **1802** is substantially small so that the first cleaning fluid **1902** can contact both the polishing pad and the wafer **102**. For example, in some embodiments, the first distance **1802** ranges from about 0.5 millimeters to about 1.5 millimeters or some other suitable range. In some embodiments, the first cleaning fluid **1902** may, for example, comprise deionized (DI) water, some chemical cleaning fluid, or some other suitable cleaning fluid.

In some embodiments, the first charge is applied to the first conductive rod(s) **120** by applying a first voltage to the first conductive rod(s) **120**. In some embodiments, the first voltage is applied to the first conductive rod(s) **120** by the first voltage supply **122** (e.g., as illustrated in FIGS. **4**A, **4**B, **5**, or FIGS. **7**A, **7**B, **8**). For example, the first controller (e.g., **224** of FIGS. **2**, **5**, **8**) controls the first voltage supply **122** to control the first charge applied to the first conductive rod(s) **120**. The polarity of the first charge is set to be opposite the polarity of the charged abrasive particles **128** to create an attractive electrostatic force between the charged abrasive particles **128** and the first conductive rod(s) **120**. The charged abrasive particles **128** are attracted to the first conductive rod(s) **120** due to the attractive electrostatic force and thus the charged abrasive particles **128** can be pulled away from the wafer **102** and onto the polishing pad **118**, as illustrated by arrows **1904**. As a result, a likelihood of charged abrasive particles **128** remaining on the wafer **102** after the first cleaning process may be reduced and hence a likelihood of defects forming along the wafer **102** may be reduced.

As shown in cross-sectional view **2000***a* of FIG. **20**A and corresponding three-dimensional view **2000***b* of FIG. **20**B, the dispensing of the first cleaning fluid (e.g., **1902** of FIGS. **19**A, **19**B) is stopped, the rotation of the wafer **102** and the wafer platen **116** is stopped, and the wafer **102** is lifted further away from the polishing pad **118** while the first charge is applied to the first conductive rod(s) **120**. For example, the wafer **102** is moved a second distance **2002** away from the polishing pad **118**, the second distance being substantially greater than the first distance (e.g., **1802** of FIG. **18**A).

After the wafer **102** is moved further away from the polishing pad **118**, the first charge can be removed from the first conductive rod(s) **120**. For example, the first voltage supply **122** can be turned off, thereby removing the first voltage and first charge from the first conductive rod(s) **120**. Because the wafer **102** is substantially further away from the polishing pad **118** and the charged abrasive particles **128** that are disposed on the polishing pad **118** when the first charge is removed from the first conductive rod(s) **120**, the charged abrasive particles **128** may remain on the polishing pad **118**. For example, because the distance between the wafer **102** and the charged abrasive particles **128** on the polishing pad **118** is substantially increased, the attractive electrostatic force between the charged abrasive particles **128** and the second dielectric layer **112** may be substantially reduced. Thus, a likelihood of the charged abrasive particles **128** being pulled back to the wafer **102** after the first charge is removed from the first conductive rod(s) **120** is substantially reduced. In some embodiments, the second distance **2002** may, for example, be about 10 times greater than the first distance, about 100 times greater than the first distance, or some other suitable value.

In some embodiments, the polishing pad **118** is cleaned after the first wafer cleaning process to remove the charged abrasive particles **128** from the polishing pad **118**. For example, the pad conditioner (e.g., **214** of FIG. **2**) may be applied to the polishing pad **118** to clean the polishing pad **118** of the remaining charged abrasive particles **128**.

In some embodiments, the wafer **102** is moved from the polishing chamber to the mega-sonic module (e.g., **204** of FIG. **2**) by the wafer transport robot (e.g., **210** of FIG. **2**). The wafer is then processed in the mega-sonic chamber. Next, the wafer **102** is moved from the mega-sonic chamber to the brushing module (e.g., **206** of FIG. **2**) by the wafer transport robot. In some embodiments, the wafer **102** placed on the wafer roller(s) (e.g., **156** of FIG. **1**B, **21**A, **21**B) in the brushing module and between the first wafer brush **132** and the second wafer brush **248**.

As shown in cross-sectional view **2100***a* of FIG. **21**A and corresponding three-dimensional view **2100***b* of FIG. **21**B, the wafer **102** is rotated by the wafer roller(s) **156**. In some embodiments, the first and second wafer brushes **132**, **248** are also rotated (e.g., in a same or different direction than the wafer **102**).

As shown in cross-sectional view **2200***a* of FIG. **22**A and corresponding three-dimensional view **2200***b* of FIG. **22**B, the second cleaning fluid **2202** is dispensed onto the wafer **102**. For example, in some embodiments, the second cleaning fluid **2202** is dispensed from the first nozzles **242** of the first spray bar **238** onto the first side **102***a* of the wafer **102** and from the second nozzles **244** of the second spray bar **240** onto a second side **102***b* of the wafer **102**, opposite the first side **102***a*. In some embodiments, the second cleaning fluid **2202** may, for example, comprise DI water, some chemical cleaning fluid, or some other suitable cleaning fluid.

In some embodiments, the second cleaning fluid **2202** is additionally or alternatively dispensed from the first wafer brush **132**. For example, a tube (e.g., **1402** of FIG. **14**A, **14**B, **14**C) may be disposed within the first wafer brush **132** (e.g., as illustrated in FIGS. **14**A, **14**B, **14**C). The second cleaning fluid **2202** may be dispensed onto the wafer **102** from the tube through openings (e.g., **1406** of FIGS. **14**B, **14**C) along the first wafer brush **132**.

As shown in cross-sectional view **2300***a* of FIG. **23**A and corresponding three-dimensional view **2300***b* of FIG. **23**B, a second charge having the second polarity is applied to the second conductive rod **138** and the first and second wafer brushes **132**, **248** are moved into contact with the wafer **102** to further clean the wafer **102**. This may be referred to as a second cleaning process. In some embodiments, the first wafer brush **132** is moved into contact with the first side **102***a* of the wafer **102** and the second wafer brush **248** is moved into contact with the second side **102***b* of the wafer **102**. In some embodiments, the first and second wafer brushes **132**, **248** contact both the wafer **102** and the second cleaning fluid **2202**.

In some embodiments, the second charge is applied to the second conductive rod **138** by applying a second voltage to the second conductive rod **138**. In some embodiments, the second voltage is applied to the second conductive rod **138** by the second voltage supply **140** (e.g., as illustrated in FIGS. **10**A, **10**B, **11**, or FIGS. **12**A, **12**B, **13**). For example, the second controller (e.g., **246** of FIGS. **2**, **11**, **13**) controls the second voltage supply **140** to control the second charge applied to the second conductive rod **138**. The polarity of the second charge is set to be opposite the polarity of the charged abrasive particles **128** to create an attractive electrostatic force between charged abrasive particles **128** remaining on the wafer **102** and the second conductive rod **138**. The charged abrasive particles **128** are attracted to the second conductive rod **138** due to the attractive electrostatic force and thus the charged abrasive particles **128** may be pulled away from the wafer **102** and onto the first wafer brush **132**, as illustrated by arrows **2302**. As a result, a likelihood of charged abrasive particles **128** remaining on the wafer **102** after the second cleaning process may be reduced and hence a likelihood of defects forming along the wafer **102** may be further reduced.

As shown in cross-sectional view **2400***a* of FIG. **24**A and corresponding three-dimensional view **2400***b* of FIG. **24**B, the first and second wafer brushes **132**, **248** are moved away from the wafer **102** and the dispensing of the second cleaning fluid (e.g., **2202** of FIGS. **22**A, **22**B, **23**A, **23**B) onto the wafer **102** is stopped while the second charge is applied to the second conductive rod **138**. The wafer and brush rotation may also be stopped.

After the first wafer brush **132** is moved substantially far away from the wafer **102**, the second charge can be removed from the second conductive rod **138**. For example, the second voltage supply **140** can be turned off, thereby removing the second voltage and hence the second charge from the second conductive rod **138**. Because the wafer **102** is substantially far away from the first wafer brush **132** and the charged abrasive particles **128** that are disposed on the first wafer brush **132** when the second charge is removed from the second conductive rod **138**, the charged abrasive particles **128** may remain on the first wafer brush **132**. For example, because the distance between the wafer **102** and the charged abrasive particles **128** on the first wafer brush **132** is substantially large, the attractive electrostatic force between the charged abrasive particles **128** and the second dielectric layer **112** may be substantially reduced. Thus, a likelihood of the charged abrasive particles **128** being pulled back to the wafer **102** after the second charge is removed from the second conductive rod **138** is substantially reduced. In some embodiments, the first wafer brush **132** may, for example, be moved about 1 to 10 centimeters or some other suitable distance away from the wafer **102** before the second charge is removed from the second conductive rod **138**.

In some embodiments, the first wafer brush **132** is cleaned after the second charge is removed from the second conductive rod **138** to remove the charged abrasive particles **128** from the first wafer brush **132**.

FIG. **25** illustrates a flow diagram of some embodiments of a method **2500** for polishing a wafer and performing a first wafer cleaning process after the polishing process. FIG. **26** illustrates a flow diagram of some embodiments of a method **2600** for performing a second wafer cleaning process after the polishing process. While methods **2500**, **2600** are illustrated and described below as a series of acts or events, it will be appreciated that the illustrated ordering of such acts or events are not to be interpreted in a limiting sense. For example, some acts may occur in different orders and/or concurrently with other acts or events apart from those illustrated and/or described herein. In addition, not all illustrated acts may be required to implement one or more aspects or embodiments of the description herein. Further, one or more of the acts depicted herein may be carried out in one or more separate acts and/or phases.

At block **2502**, affix a wafer to a wafer carrier and position the wafer over a wafer platen. FIG. **15**A illustrates a cross-sectional view **1500***a* and FIG. **15**B illustrates a three-dimensional view **1500***b* of some embodiments corresponding to block **2502**.

At block **2504**, rotate the wafer platen and the wafer. FIG. **15**A illustrates a cross-sectional view **1500***a* and FIG. **15**B illustrates a three-dimensional view **1500***b* of some embodiments corresponding to block **2504**.

At block **2506**, dispense an abrasive slurry onto a polishing pad that is on the wafer platen, the abrasive slurry including charged abrasive particles having a first polarity. FIG. **16**A illustrates a cross-sectional view **1600***a* and FIG. **16**B illustrates a three-dimensional view **1600***b* of some embodiments corresponding to block **2506**.

At block **2508**, move the wafer toward the polishing pad so a first side of the wafer is in contact with the abrasive slurry and the polishing pad. FIG. **17**A illustrates a cross-sectional view **1700***a* and FIG. **17**B illustrates a three-dimensional view **1700***b* of some embodiments corresponding to block **2508**.

At block **2510**, stop dispensing the abrasive slurry and move the wafer away from the polishing pad so the first side of the wafer is a first distance away from the polishing pad. FIG. **18**A illustrates a cross-sectional view **1800***a* and FIG. **18**B illustrates a three-dimensional view **1800***b* of some embodiments corresponding to block **2510**.

At block **2512**, dispense a first cleaning fluid onto the polishing pad so the first cleaning fluid is in contact with both the polishing pad and the first side of the wafer. FIG. **19**A illustrates a cross-sectional view **1900***a* and FIG. **19**B illustrates a three-dimensional view **1900***b* of some embodiments corresponding to block **2512**.

At block **2514**, apply a first charge to a first conductive rod arranged within the wafer platen while the wafer is directly over the polishing pad and while the first cleaning fluid is directly between the first side of the wafer and the polishing pad, the first charge having a second polarity, opposite the first polarity. FIG. **19**A illustrates a cross-sectional view **1900***a* and FIG. **19**B illustrates a three-dimensional view **1900***b* of some embodiments corresponding to block **2514**.

At block **2516**, stop dispensing the first cleaning fluid and move the wafer further away from the polishing pad so the first side of the wafer is a second distance away from the polishing pad while the first charge is applied to the first conductive rod. In some embodiments, the rotation of the wafer and the wafer platen may be stopped at block **2516**. FIG. **20**A illustrates a cross-sectional view **2000***a* and FIG. **20**B illustrates a three-dimensional view **2000***b* of some embodiments corresponding to block **2516**.

At block **2518**, remove the first charge from the first conductive rod and clean the polishing pad.

In some embodiments, method **2600** is performed after method **2500**.

At block **2602**, position the wafer between a first wafer brush and a second wafer brush. FIG. **21**A illustrates a cross-sectional view **2100***a* and FIG. **21**B illustrates a three-dimensional view **2100***b* of some embodiments corresponding to block **2602**.

At block **2604**, rotate the wafer and the first and second wafer brushes. FIG. **21**A illustrates a cross-sectional view **2100***a* and FIG. **21**B illustrates a three-dimensional view **2100***b* of some embodiments corresponding to block **2604**.

At block **2606**, dispense a second cleaning fluid onto the first side of the wafer. FIG. **22**A illustrates a cross-sectional view **2200***a* and FIG. **22**B illustrates a three-dimensional view **2200***b* of some embodiments corresponding to block **2606**.

At block **2608**, move the first wafer brush into contact with the first side of the wafer and move the second wafer brush into contact with a second side of the wafer. FIG. **23**A illustrates a cross-sectional view **2300***a* and FIG. **23**B illustrates a three-dimensional view **2300***b* of some embodiments corresponding to block **2608**.

At block **2610**, apply a second charge to a second conductive rod arranged within the first wafer brush while the first wafer brush is in contact with the first side of the wafer, the second charge having the second polarity. FIG. **23**A illustrates a cross-sectional view **2300***a* and FIG. **23**B illustrates a three-dimensional view **2300***b* of some embodiments corresponding to block **2610**.

At block **2612**, stop dispensing the second cleaning fluid and move the first wafer brush away from the first side of the wafer while the second charge is applied to the second conductive rod. The second wafer brush may be moved away from the second side of the wafer at block **2612**. In some embodiments, the rotation of the wafer and the first and second wafer brushes may be stopped at block **2612**. FIG. **24**A illustrates a cross-sectional view **2400***a* and FIG. **24**B illustrates a three-dimensional view **2400***b* of some embodiments corresponding to block **2612**.

At block **2614**, remove the second charge from the second conductive rod and clean the first wafer brush.

Thus, the present disclosure relates to a process tool and a method for removing charged particles from a wafer after polishing the wafer to reduce defects along the wafer after the polishing.

Accordingly, in some embodiments, the present disclosure relates to a process tool including a first voltage supply, a second voltage supply, and a wafer platen. A polishing pad is on a top surface of the wafer platen. A wafer carrier is over the polishing pad and configured to hold a wafer over the polishing pad. A slurry dispenser is over the polishing pad and configured to dispense an abrasive slurry including a plurality of charged abrasive particles having a first polarity onto the polishing pad. A first conductive rod is within the wafer platen. The first conductive rod is coupled to the first voltage supply. A wafer roller is configured to support and rotate the wafer. A first wafer brush is arranged beside the wafer roller. A second conductive rod is within the first wafer brush. The second conductive rod is coupled to the second voltage supply. The first voltage supply is configured to apply a first charge having a second polarity, opposite the first polarity, to the first conductive rod. The second voltage supply is configured to apply a second charge having the second polarity to the second conductive rod.

In other embodiments, the present disclosure relates to a method. The method includes affixing a wafer to a wafer carrier. The wafer is positioned over a polishing pad that is disposed on a wafer platen. The wafer platen and the wafer are rotated. An abrasive slurry is dispensed onto the polishing pad. The abrasive slurry includes a plurality of charged abrasive particles having a first polarity. A first side of the wafer is moved into contact with the abrasive slurry and the polishing pad. The first side of the wafer is moved a first distance away from the polishing pad. A first cleaning fluid is dispensed onto the polishing pad while the wafer is the first distance away from the polishing pad so the first cleaning fluid is directly between the polishing pad and the first side of the wafer. A first charge having a second polarity, opposite the first polarity, is applied to a first conductive rod arranged within the wafer platen while the wafer is directly over the polishing pad and while the first cleaning fluid is directly between the first side of the wafer and the polishing pad. The first side of the wafer is moved a second distance away from the polishing pad while the first charge is applied to the first conductive rod. The second distance is different from the first distance.

In yet other embodiments, the present disclosure relates to a method. The method includes polishing a first side of a wafer with an abrasive slurry. The abrasive slurry includes a plurality of charged abrasive particles having a first polarity. The wafer is arranged on a wafer roller and adjacent to a first wafer brush. The wafer and the first wafer brush are rotated. A first cleaning fluid is dispensed onto the first side of the wafer. The first wafer brush is moved into contact with the first side of the wafer. A first charge having a second polarity, opposite the first polarity, is applied to a first conductive rod arranged within the first wafer brush while the first wafer brush is in contact with the first side of the wafer. The first wafer brush is moved away from the first side of the wafer while the first charge is applied to the first conductive rod.

The foregoing outlines features of several embodiments so that those skilled in the art may better understand the aspects of the present disclosure. Those skilled in the art should appreciate that they may readily use the present disclosure as a basis for designing or modifying other processes and structures for carrying out the same purposes and/or achieving the same advantages of the embodiments introduced herein. Those skilled in the art should also realize that such equivalent constructions do not depart from the spirit and scope of the present disclosure, and that they may make various changes, substitutions, and alterations herein without departing from the spirit and scope of the present disclosure.

What is claimed is:

1. A method comprising:

providing a slurry to a polishing pad that is disposed on a wafer platen, the slurry comprising a plurality of electrically charged abrasive particles having a first electrical polarity;

moving a first side of a wafer into contact with the slurry and the polishing pad;

while the wafer is directly over the polishing pad, applying a first electrical charge having a second electrical polarity, opposite the first electrical polarity, to a first conductive rod arranged within the wafer platen;

moving the first side of the wafer away from the polishing pad while the first electrical charge is applied to the first conductive rod;

moving a first wafer brush into contact with the first side of the wafer;

while the first wafer brush is in contact with the first side of the wafer, applying a second electrical charge having the second electrical polarity, opposite the first electrical polarity, to a second conductive rod arranged within the first wafer brush; and

moving the first wafer brush away from the first side of the wafer while the second first electrical charge is applied to the second conductive rod.

2. The method of claim **1**, wherein moving the first side of the wafer into contact with the slurry and the polishing pad causes material to be removed from the first side of the wafer.

3. The method of claim **1**, further comprising:

removing the second electrical charge from the second conductive rod after moving the first wafer brush away from the first side of the wafer; and

cleaning the first wafer brush after the second electrical charge is removed from the second conductive rod to remove electrically charged abrasive particles of the plurality of electrically charged abrasive particles from the first wafer brush.

4. The method of claim **1**, further comprising:

moving a second wafer brush into contact with a second side of the wafer when moving the first wafer brush into contact with the first side of the wafer.

5. The method of claim **1**, further comprising:

moving the wafer to a mega-sonic module and processing the wafer in the mega-sonic module after moving the first side of the wafer away from the polishing pad and before moving the first wafer brush into contact with the first side of the wafer.

6. The method of claim **1**, further comprising:

rotating the wafer and the wafer platen in different directions when moving the first side of the wafer into contact with the slurry and the polishing pad.

7. A method comprising:

positioning a wafer over a polishing pad that is disposed on a wafer platen;

rotating the wafer platen and the wafer;

dispensing an abrasive slurry onto the polishing pad, the abrasive slurry comprising a plurality of charged abrasive particles having a first electrical polarity;

moving a first side of the wafer into contact with the abrasive slurry and the polishing pad while rotating the wafer platen and the wafer;

moving the first side of the wafer a first distance away from the polishing pad;

while the wafer is directly over the polishing pad and the wafer is the first distance away from the polishing pad, applying a first electrical charge having a second electrical polarity, opposite the first electrical polarity, to a first conductive rod arranged within the wafer platen;

moving the first side of the wafer a second distance away from the polishing pad while the first electrical charge is applied to the first conductive rod, wherein the second distance is greater than the first distance;

moving a first wafer brush into contact with the first side of the wafer;

while the first wafer brush is in contact with the first side of the wafer, applying a second electrical charge having the second electrical polarity, opposite the first electrical polarity, to a second conductive rod arranged within the first wafer brush; and

moving the first wafer brush away from the first side of the wafer while the second electrical charge is applied to the second conductive rod.

8. The method of claim **7**, further comprising:

dispensing a first cleaning fluid onto the polishing pad while the wafer is the first distance away from the polishing pad so the first cleaning fluid is directly between the polishing pad and the first side of the wafer, wherein the first electrical charge is applied to first conductive rod while the first cleaning fluid is directly between the first side of the wafer and the polishing pad.

9. The method of claim **7**, further comprising:

dispensing a second cleaning fluid onto the first side of the wafer while moving the first wafer brush into contact with the first side of the wafer.

10. The method of claim **7**, wherein applying the first electrical charge to the first conductive rod comprises coupling the first conductive rod to a first voltage supply, wherein applying the second electrical charge to the second conductive rod comprises coupling the second conductive rod to a second voltage supply, separate from the first voltage supply.

11. The method of claim **7**, wherein applying the first electrical charge to the first conductive rod comprises coupling a first end of the first conductive rod to a first terminal of a first voltage supply and coupling a second end of the first conductive rod, opposite the first end, to a second terminal of the first voltage supply.

12. The method of claim **7**, further comprising:

removing the first electrical charge from the first conductive rod after moving the first side of the wafer the second distance away from the polishing pad; and

removing the charged abrasive particles from the polishing pad after removing the first electrical charge from the first conductive rod.

13. The method of claim **7**, wherein the wafer platen and the wafer are rotated in the same direction while the first side of the wafer is moved into contact with the abrasive slurry and the polishing pad.

14. The method of claim **7**, further comprising:

rotating the wafer platen and the wafer while moving the first side of the wafer the first distance away from the polishing pad;

rotating the wafer platen and the wafer while applying the first electrical charge to the first conductive rod; and

rotating the wafer platen and the wafer while moving the first side of the wafer the second distance away from the polishing pad.

15. A method comprising:

providing a slurry to a polishing pad that is disposed on a wafer platen, the slurry comprising a plurality of electrically charged abrasive particles having a first electrical polarity;

moving a first side of a wafer into contact with the slurry and the polishing pad;

while the wafer is directly over the polishing pad, applying a first electrical charge having a second electrical polarity, opposite the first electrical polarity, to a first conductive rod arranged within the wafer platen;

moving the first side of the wafer away from the polishing pad while the first electrical charge is applied to the first conductive rod;

rotating the wafer and a first wafer brush;

moving the first wafer brush into contact with the first side of the wafer while rotating the wafer and the first wafer brush;

while the first wafer brush is in contact with the first side of the wafer and while rotating the wafer and the first wafer brush, applying a second electrical charge having the second electrical polarity, opposite the first electrical polarity, to a second conductive rod arranged within the first wafer brush; and

moving the first wafer brush away from the first side of the wafer while the second electrical charge is applied to the second conductive rod.

16. The method of claim **15**, further comprising:

arranging the wafer on a wafer roller and adjacent to the first wafer brush, wherein the wafer roller rotates the wafer.

17. The method of claim **15**, wherein the first wafer brush is moved into contact with the first side of the wafer after moving the first side of the wafer away from the polishing pad.

18. The method of claim **15**, further comprising:

dispensing a first cleaning fluid onto the first side of the wafer from a tube disposed within the second conductive rod.

19. The method of claim **15**, wherein a magnitude of the second electrical charge is different than a magnitude of the first electrical charge.

20. The method of claim **15**, further comprising:

rotating the wafer and the first wafer brush while moving the first wafer brush away from the first side of the wafer.

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