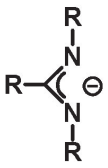
Amine



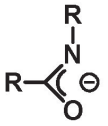
1

Amidinate



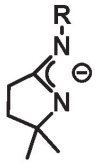
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Amidate



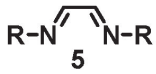
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Iminopyrrolidinate



4

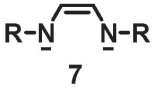
Diazabutadiene



5

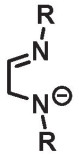


6



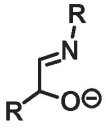
7

Beta-imino amide



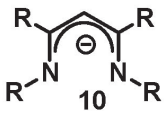
8

Alpha-imino alkoxide



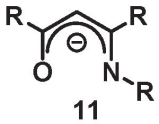
9

Beta-diketiminate



10

Beta-ketoiminate



11

Beta-diketonate



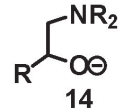
12

Pyrazolate



13

Beta-amino alkoxide



14

Guanidinidate



15

Amide



16

Imide



17

Figure 1A

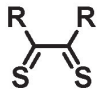
Thioether SR_2

18

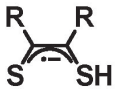
Thiolate $^{\ominus}SR$

19

Dithiolene



20

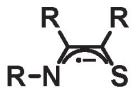


21



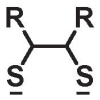
22

Alpha-iminothiolene



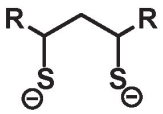
23

Alpha-Dithiolate



24

Beta-Dithiolate



25

Figure 1B

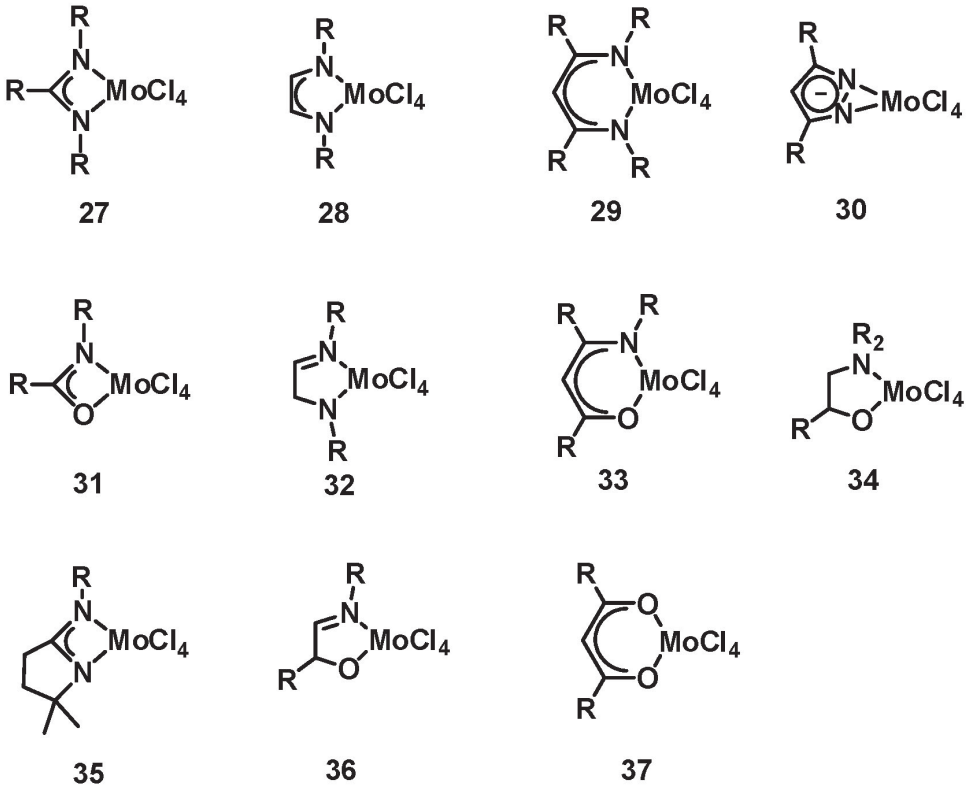


Figure 2

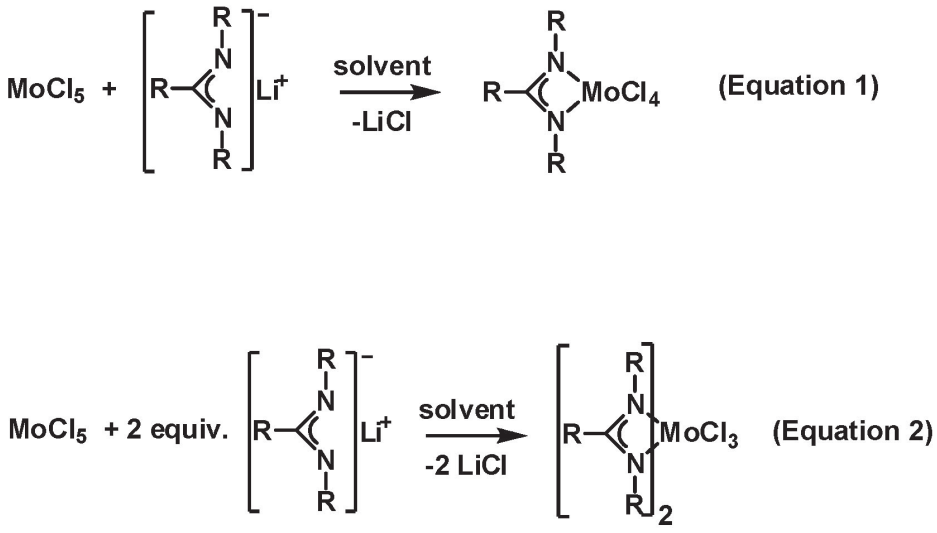

MoCl5 +
R
N
R
N
R
Li+
solvent
-LiCl
MoCl4
(Equation 1)
MoCl5 + 2 equiv.
solvent
-2 LiCl
MoCl3
2

Figure 3

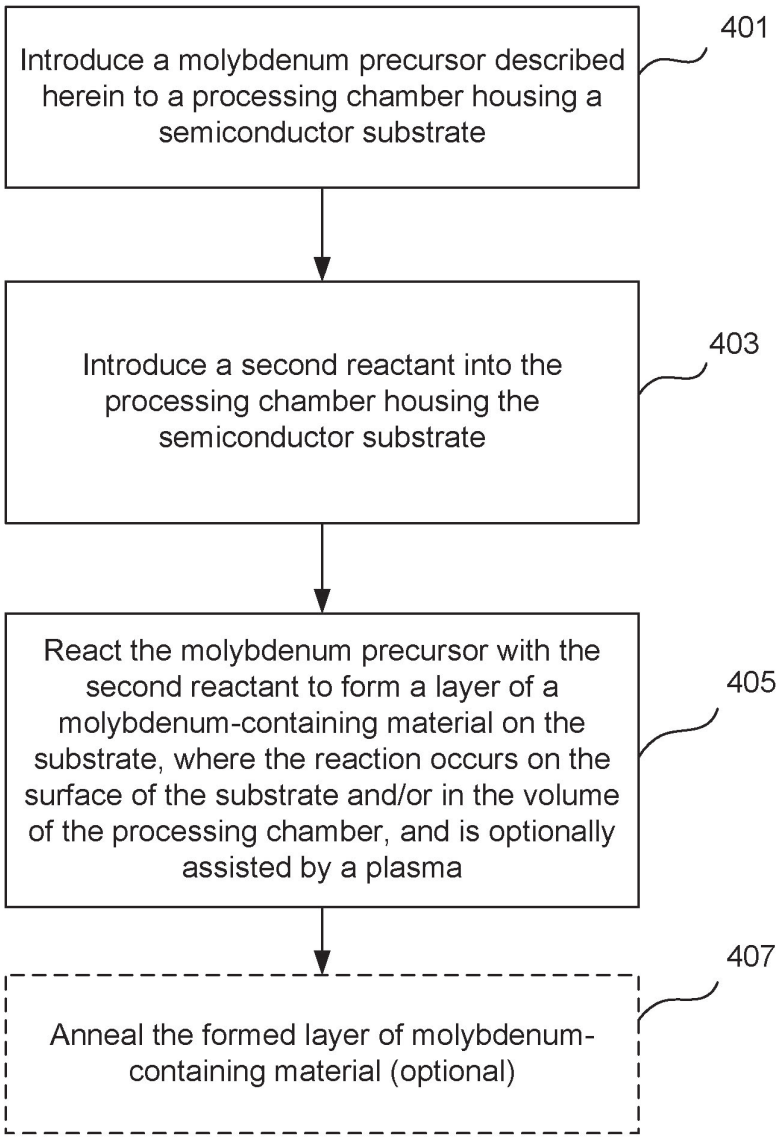

Introduce a molybdenum precursor described herein to a processing chamber housing a semiconductor substrate
401
Introduce a second reactant into the processing chamber housing the semiconductor substrate
403
React the molybdenum precursor with the second reactant to form a layer of a molybdenum-containing material on the substrate, where the reaction occurs on the surface of the substrate and/or in the volume of the processing chamber, and is optionally assisted by a plasma
405
Anneal the formed layer of molybdenum-containing material (optional)
407

Figure 4A

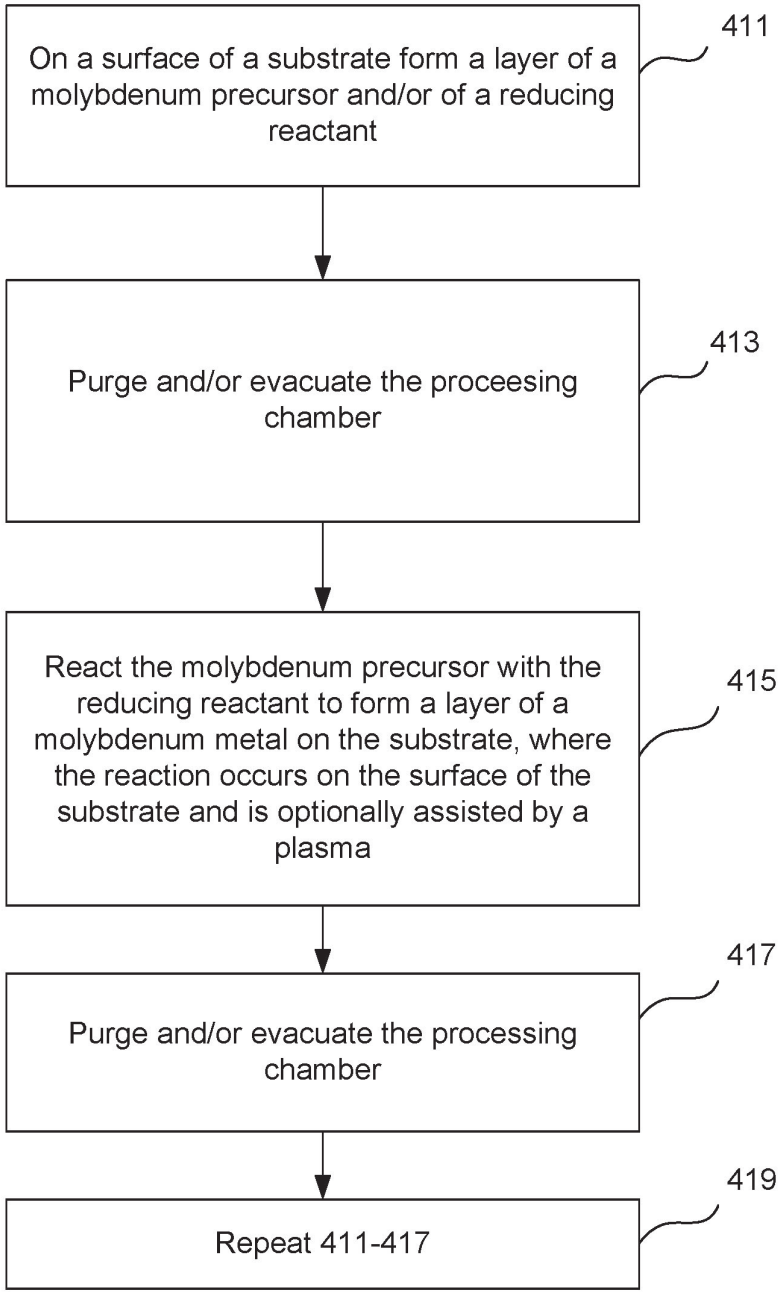

On a surface of a substrate form a layer of a molybdenum precursor and/or of a reducing reactant
411
Purge and/or evacuate the proceesing chamber
413
React the molybdenum precursor with the reducing reactant to form a layer of a molybdenum metal on the substrate, where the reaction occurs on the surface of the substrate and is optionally assisted by a plasma
415
Purge and/or evacuate the processing chamber
417
Repeat 411-417
419

Figure 4B

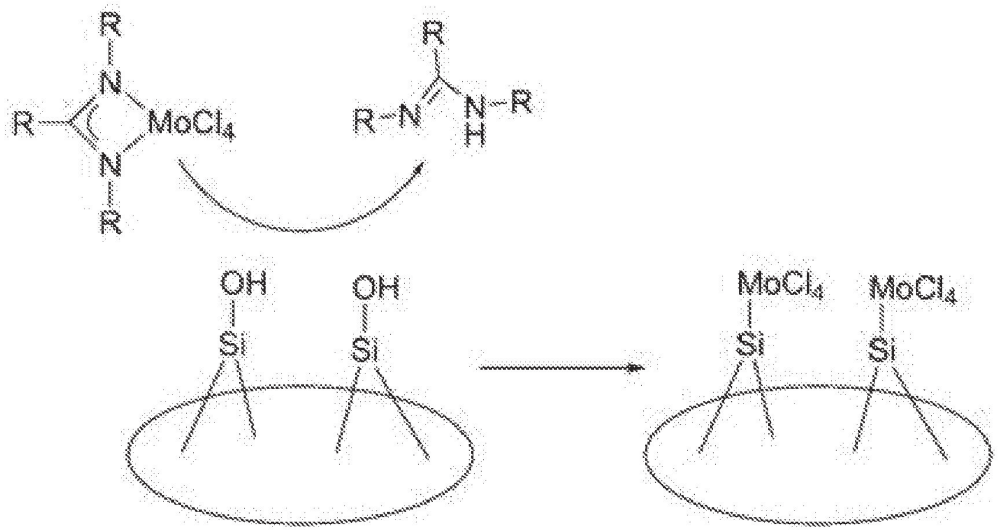


Figure 5

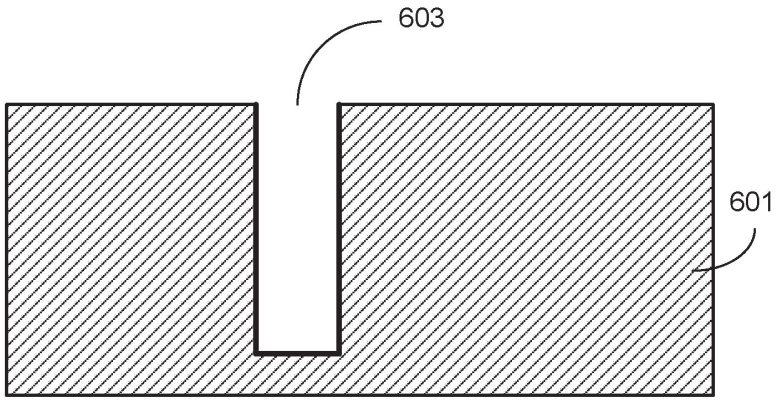


Figure 6A

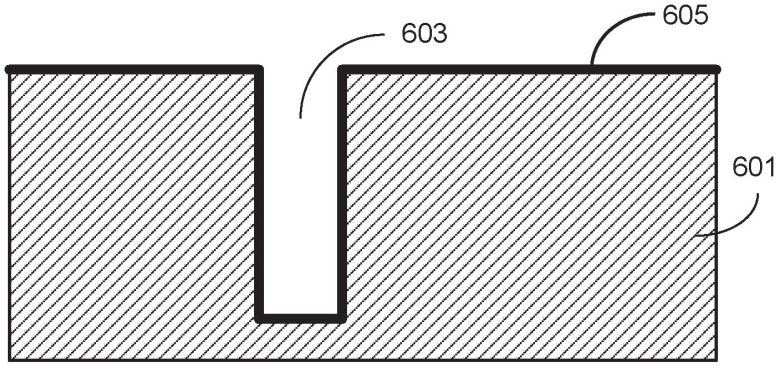


Figure 6B

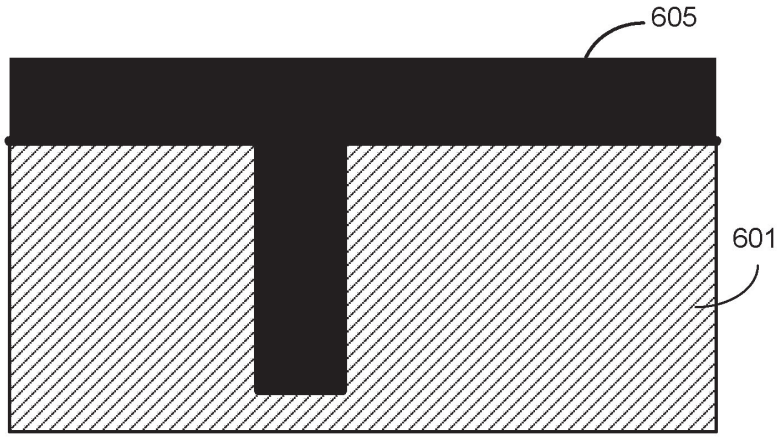


Figure 6C

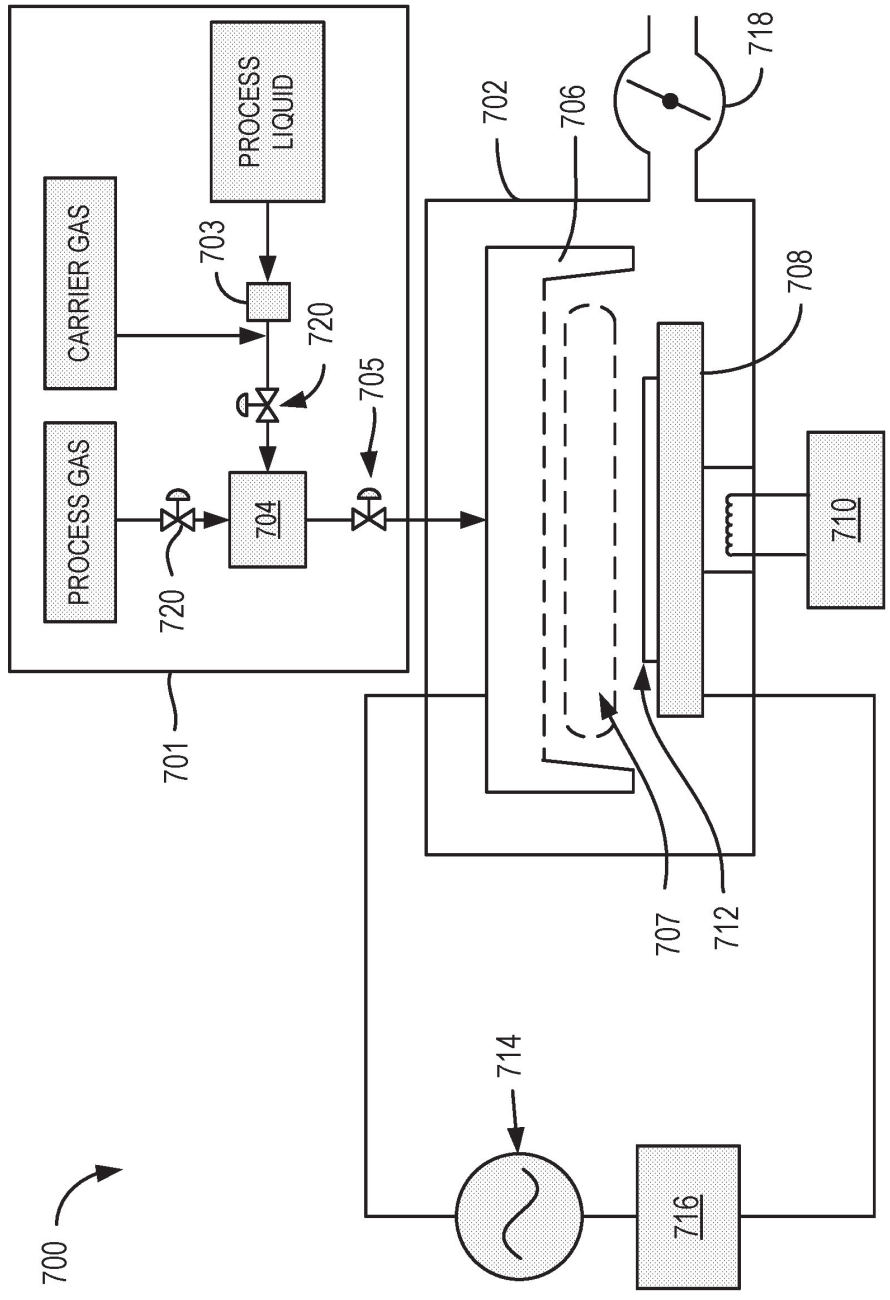

PROCESS LIQUID
CARRIER GAS
PROCESS GAS
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FIG. 7

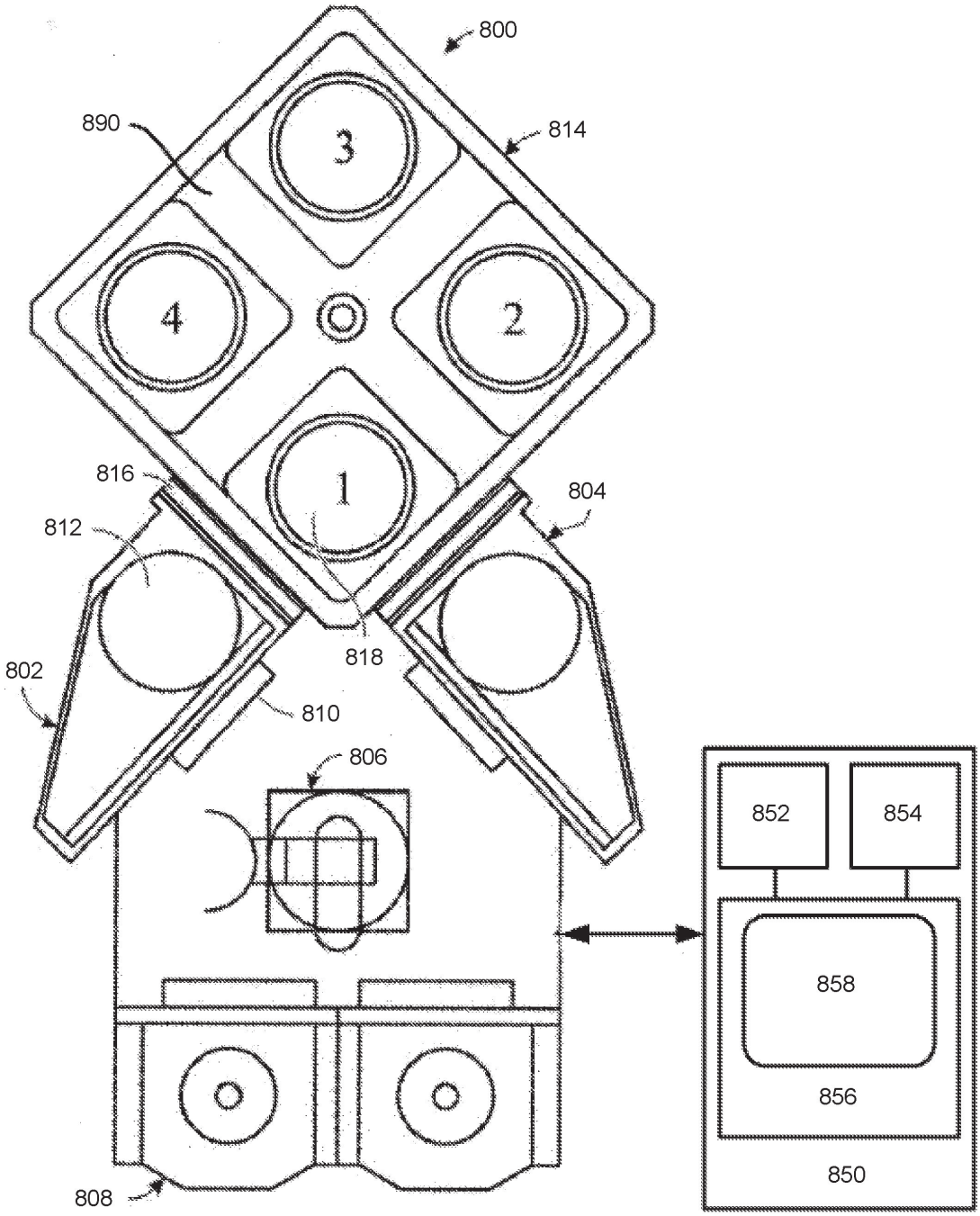

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FIG. 8

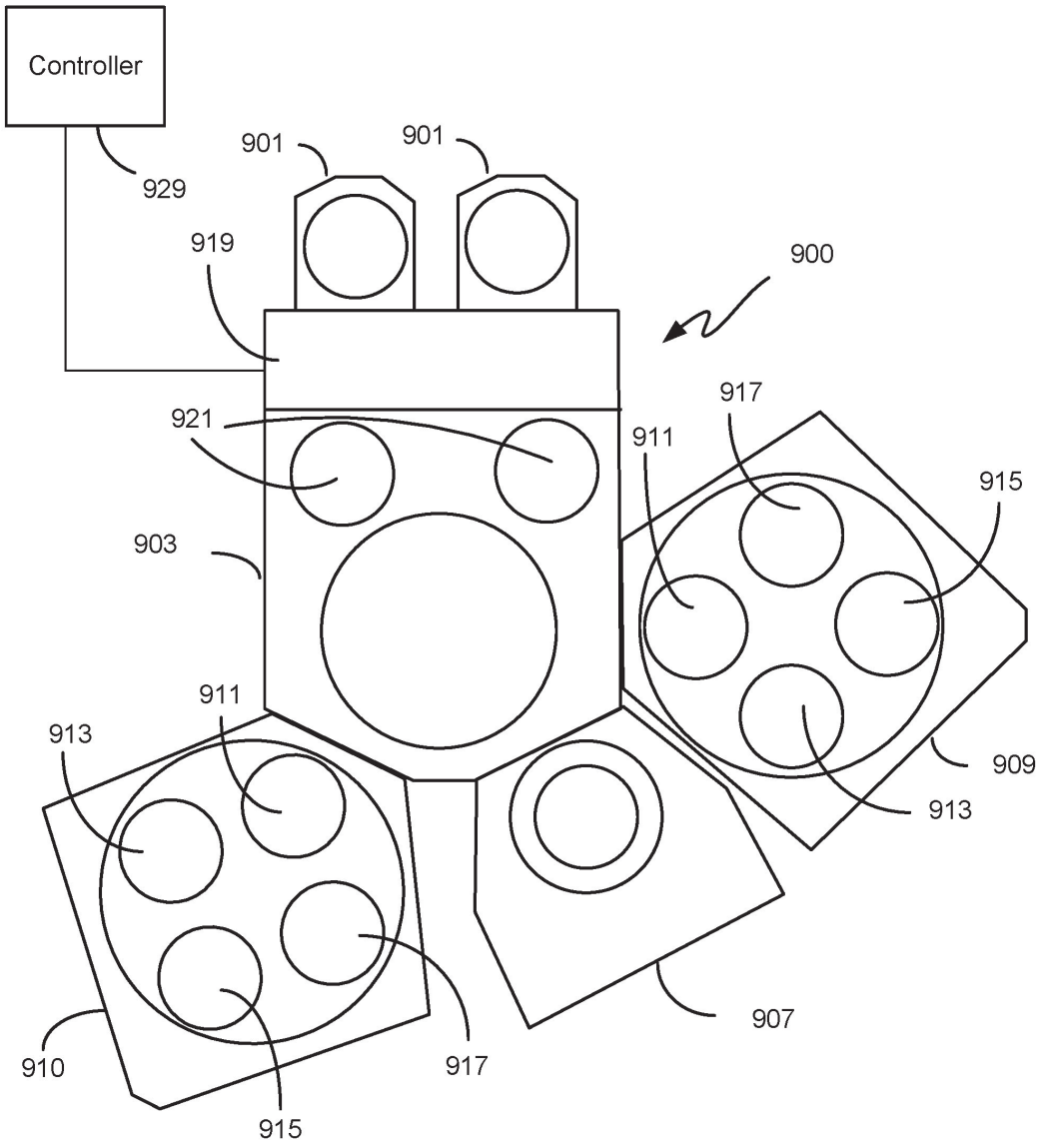

Controller
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FIG. 9