

1/29

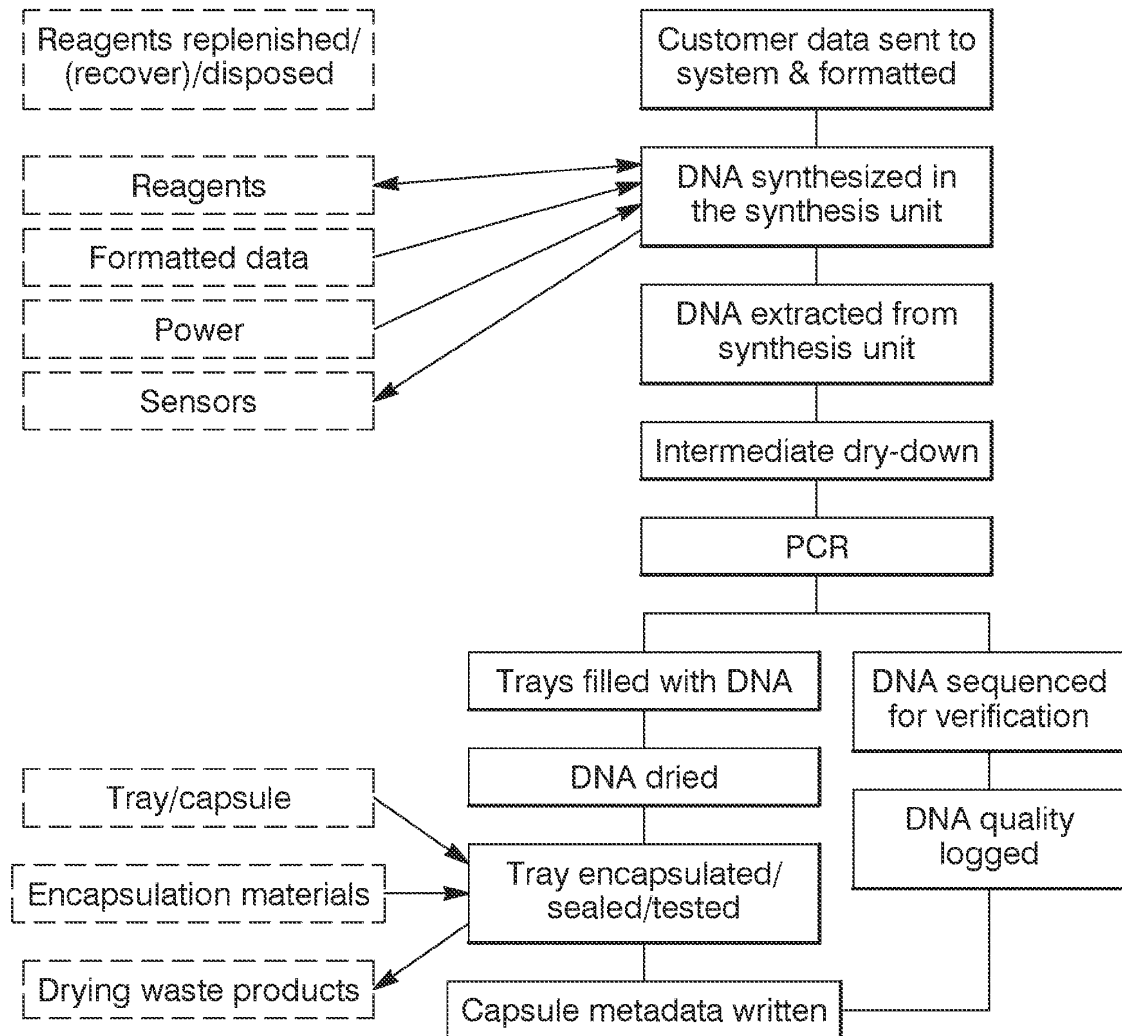


FIG. 1A

2/29

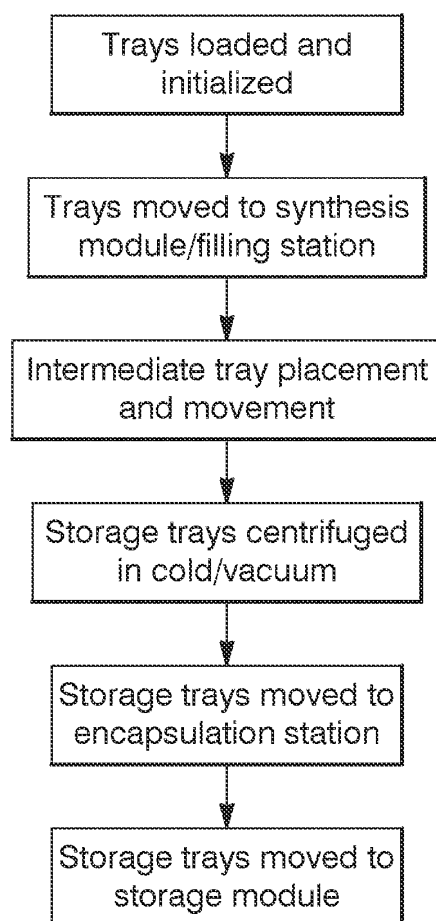


FIG. 1B

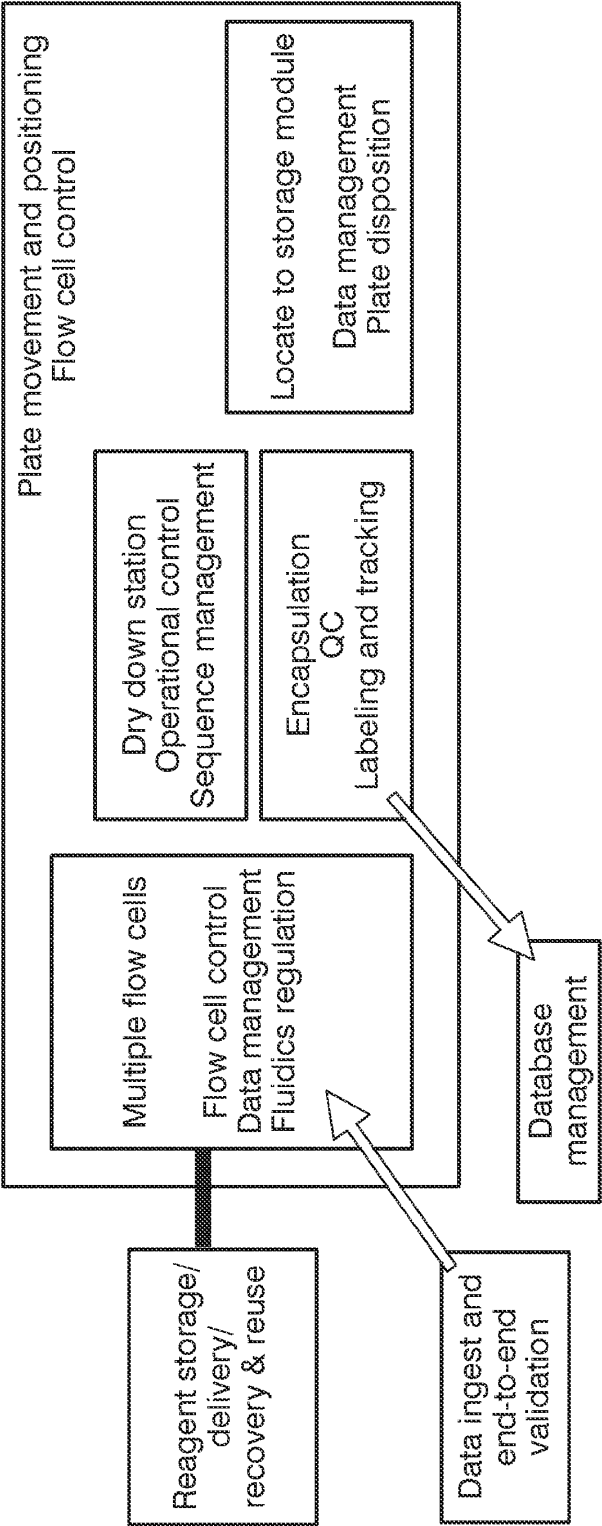
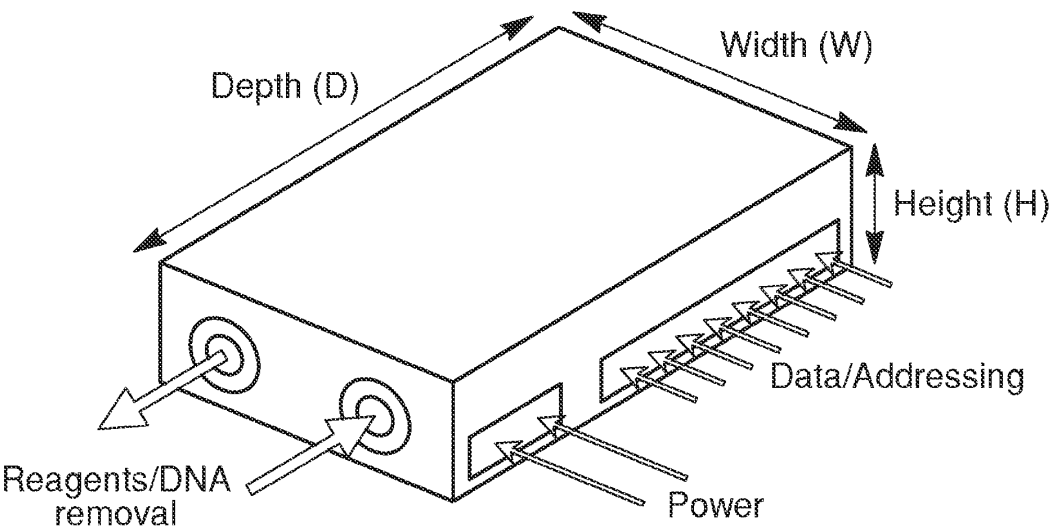


FIG. 1C

4/29



One DNA data synthesis module (6U)				
10	chips high		2.65	cm
11	chips wide		4.01	cm
2	Double sided - front and back			
220	Chips per synthesis module (target 200)			

FIG. 2A

5/29

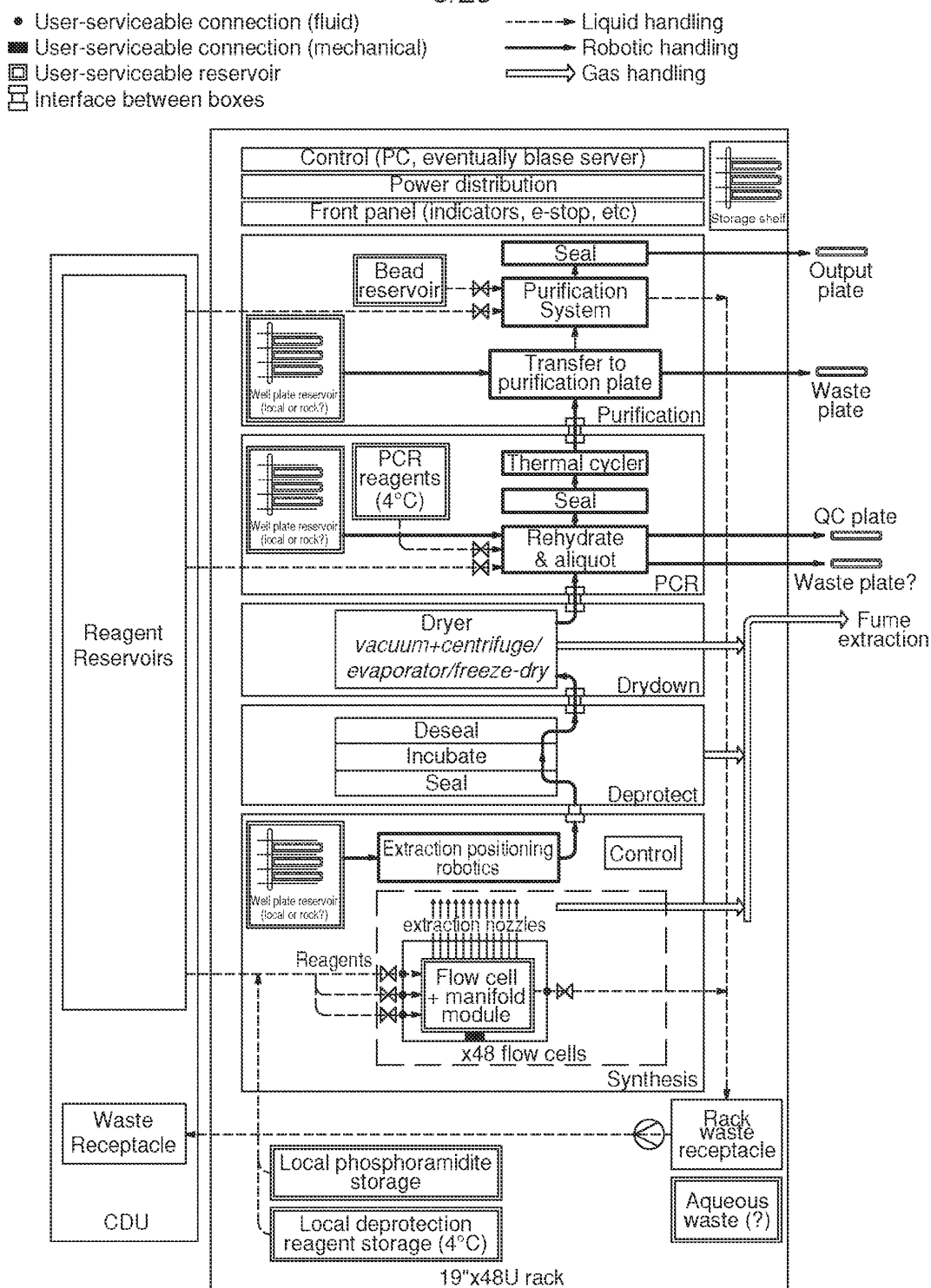


FIG. 2B

6/29

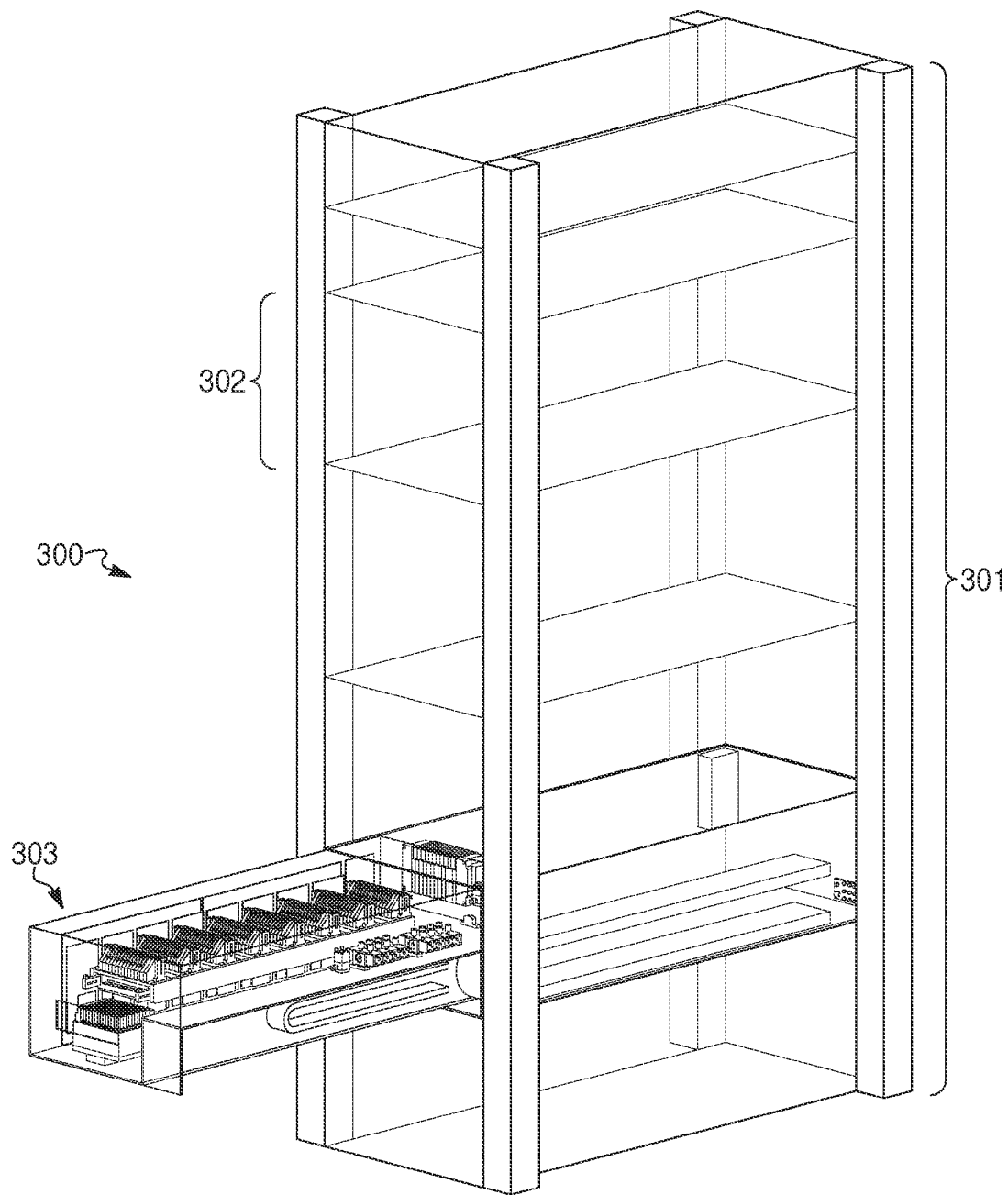


FIG. 3A

7/29

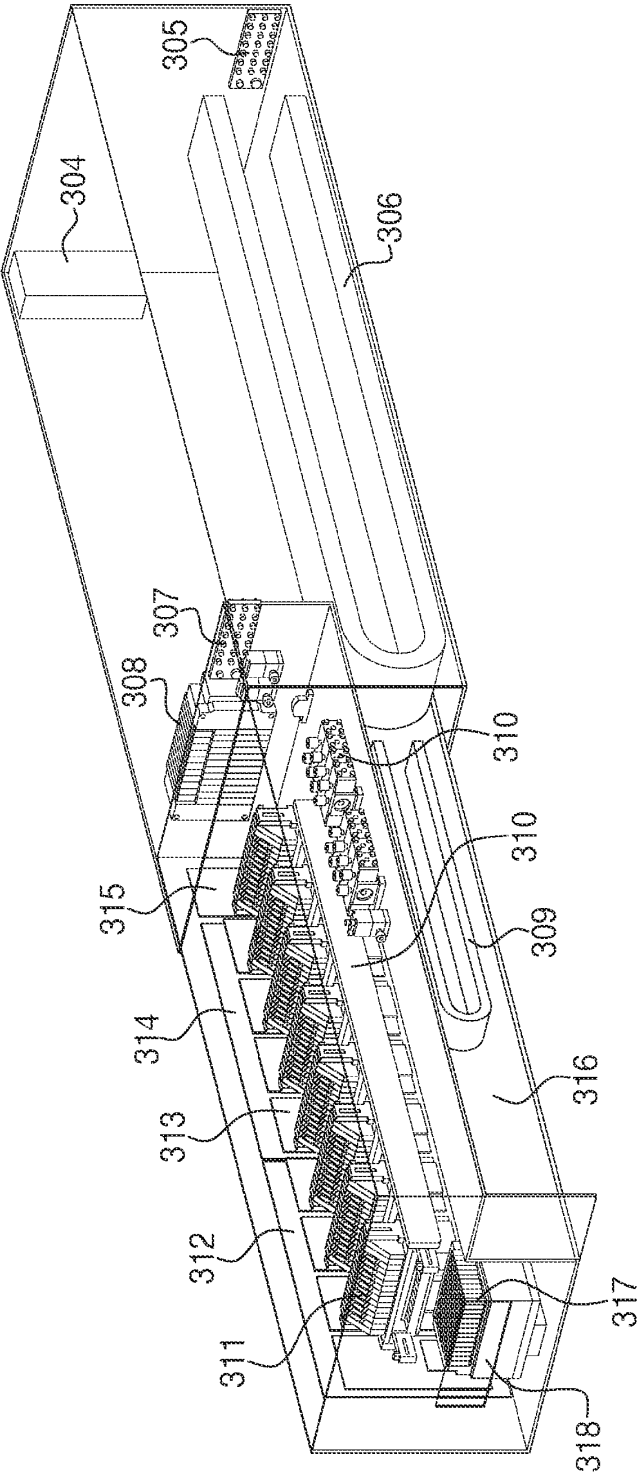


FIG. 3B

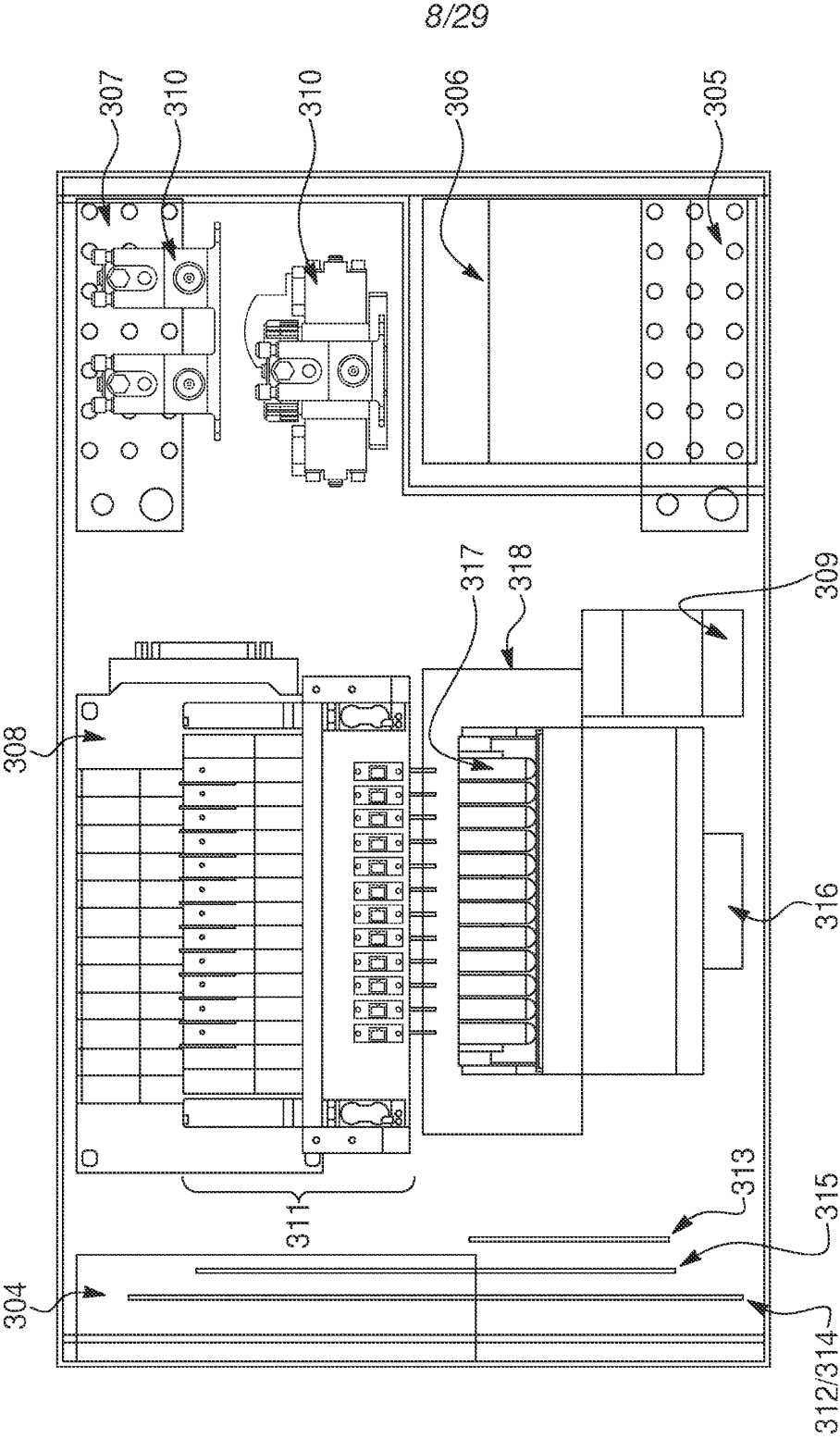


FIG. 3C

9/29

305/307

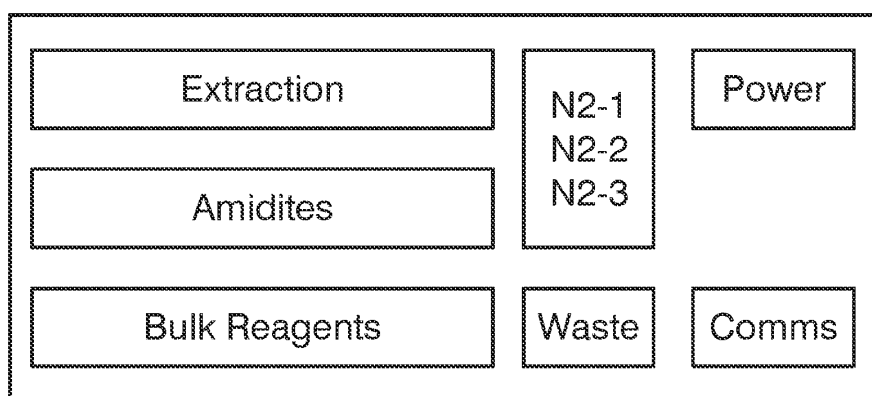


FIG. 3D

10/29

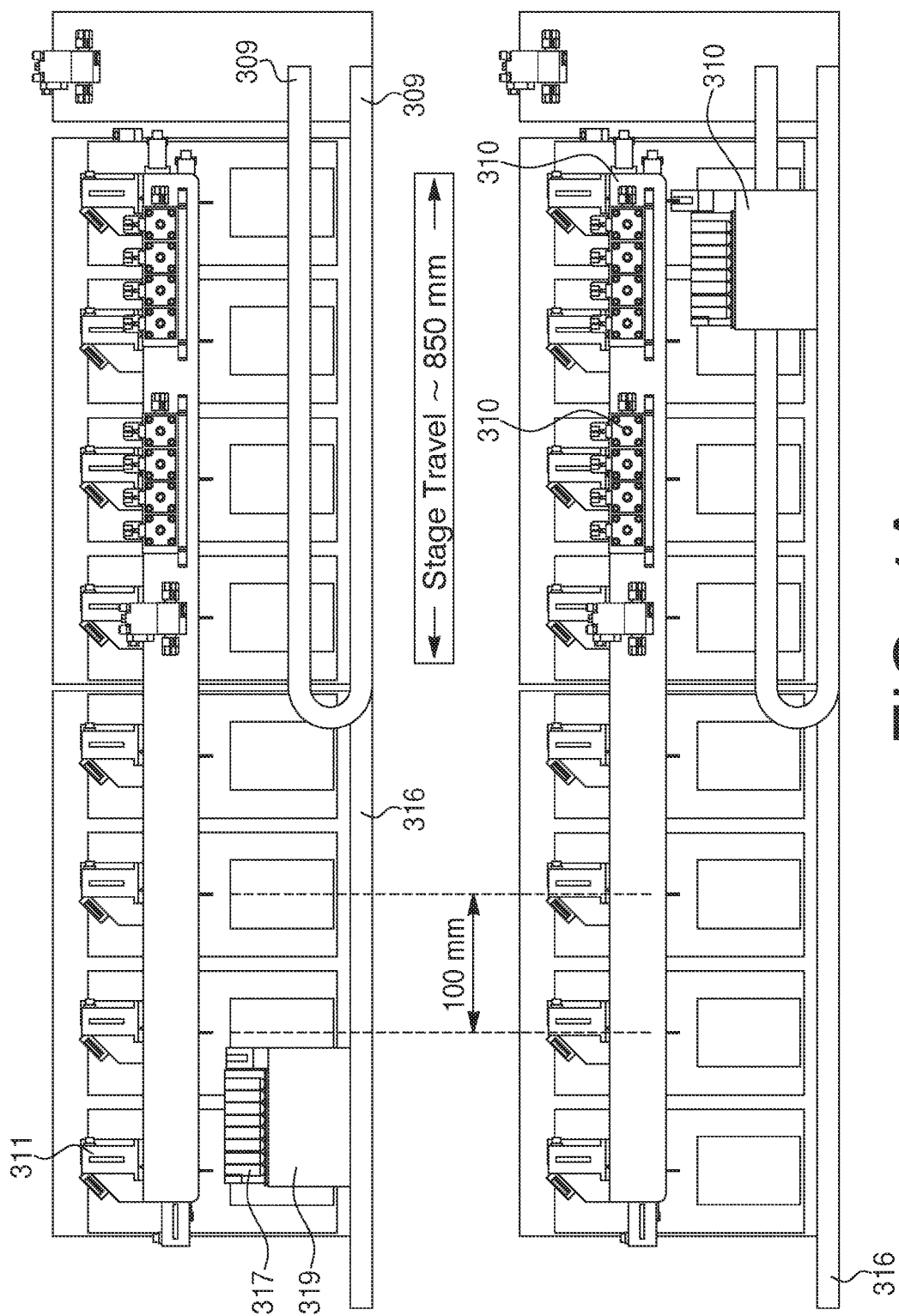
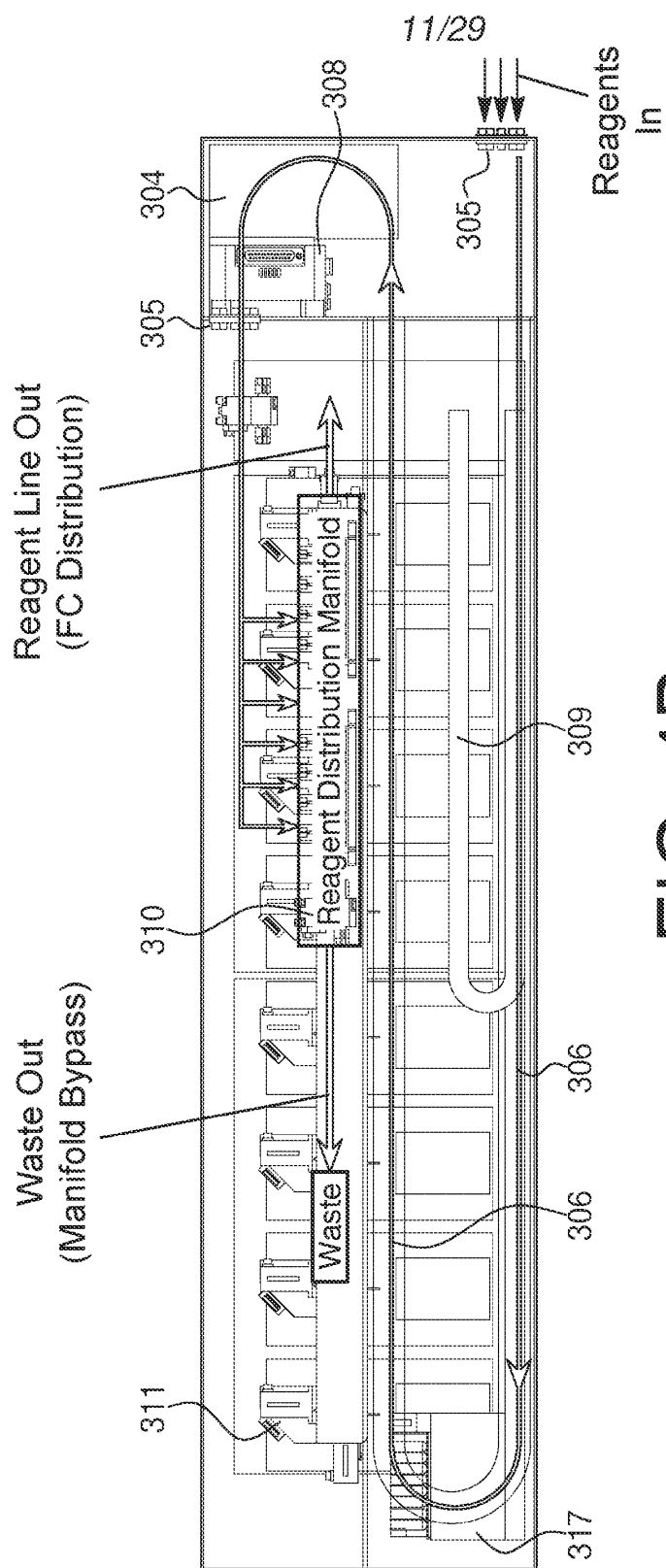


Fig. 4A

B4G⁺L

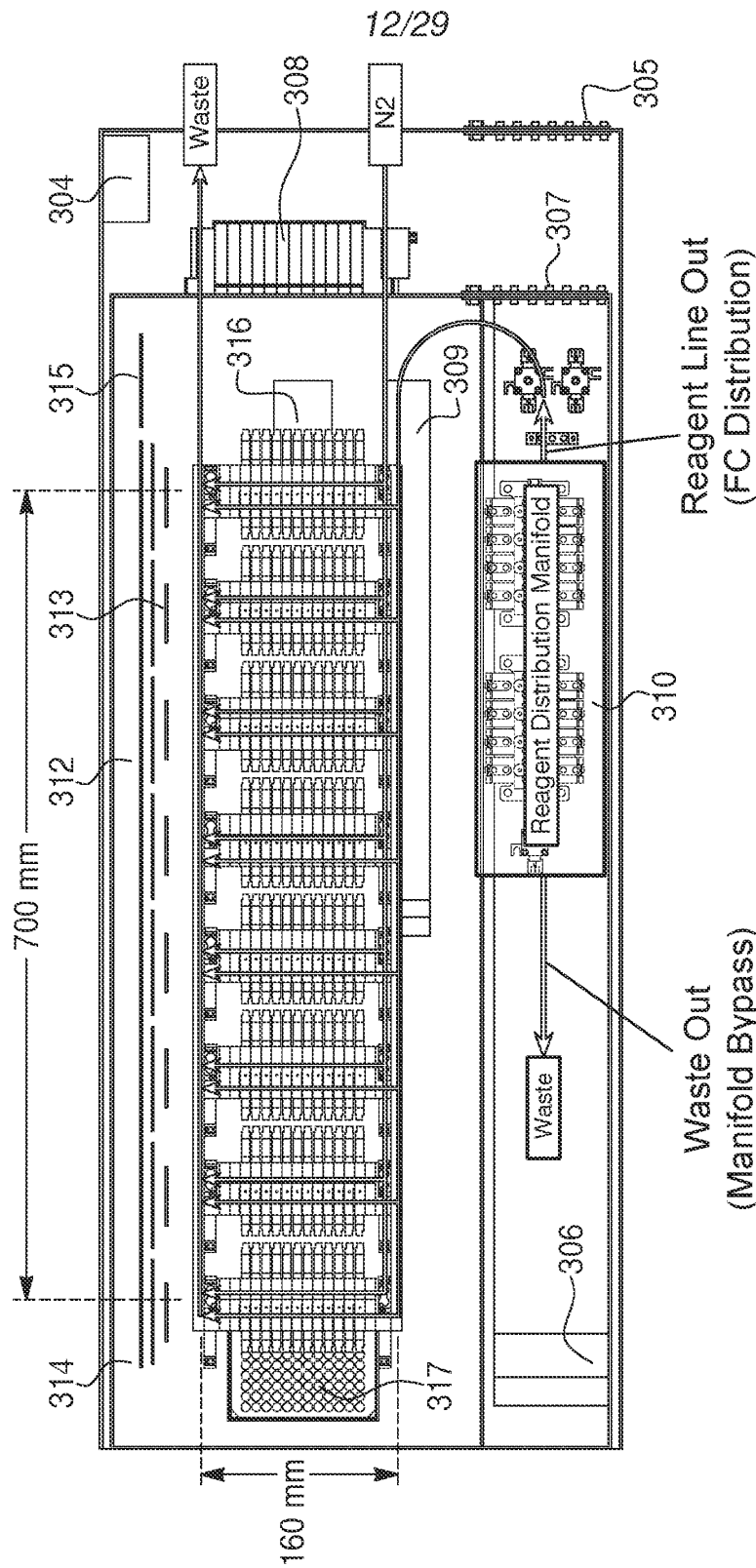
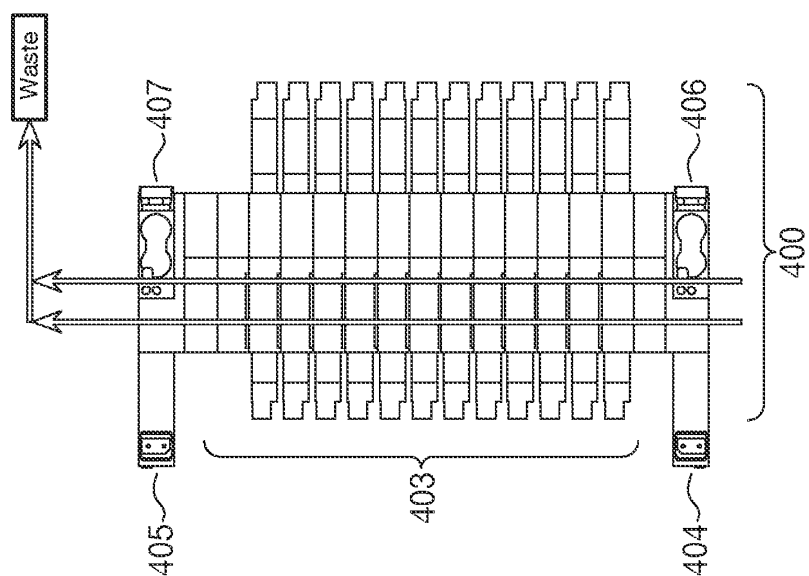


FIG. 4C



45

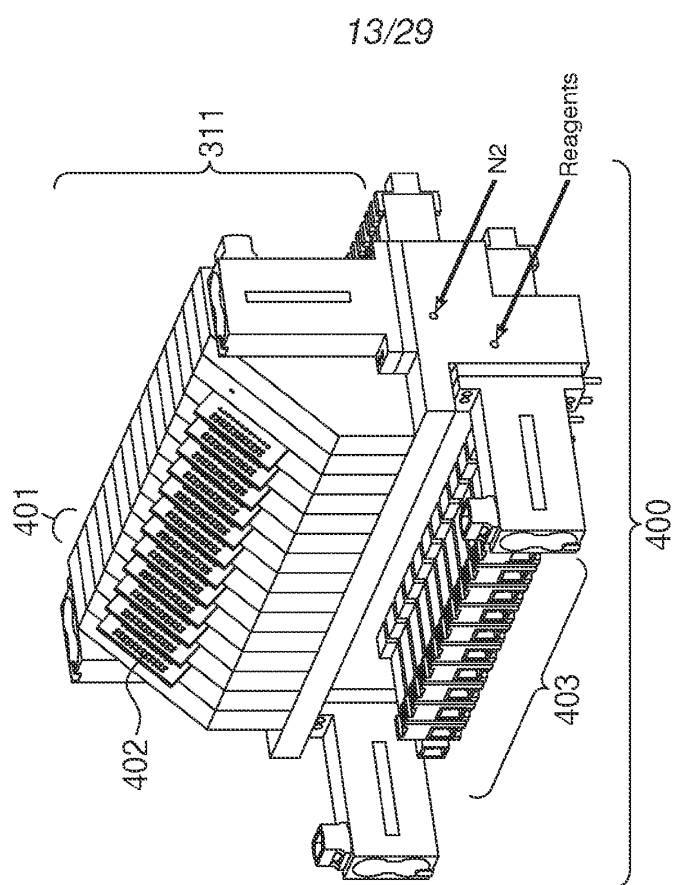


Fig. 4E

14/29

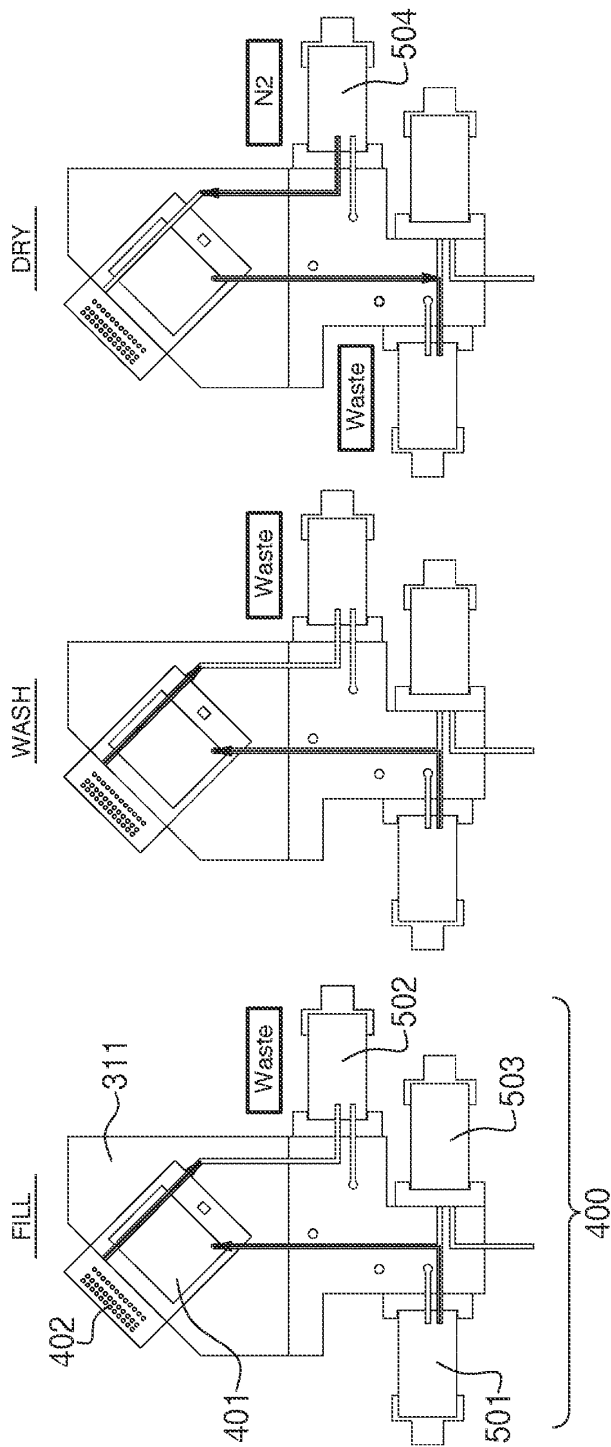


FIG. 5A

15/29

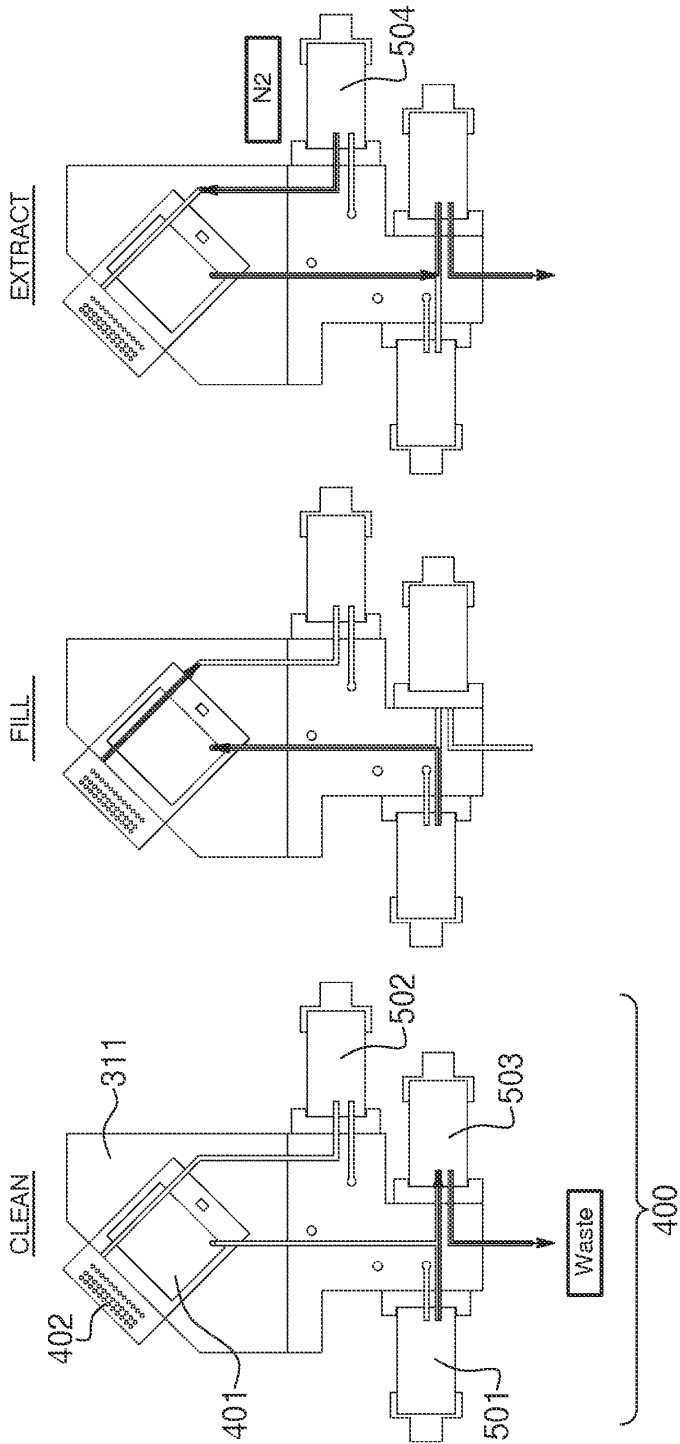


FIG. 5B

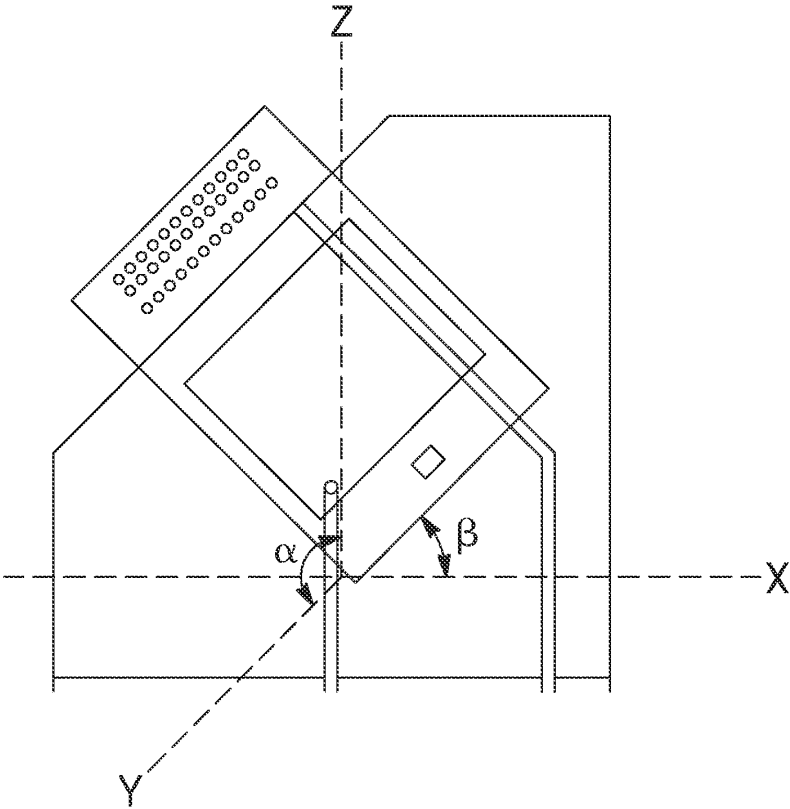


FIG. 5C

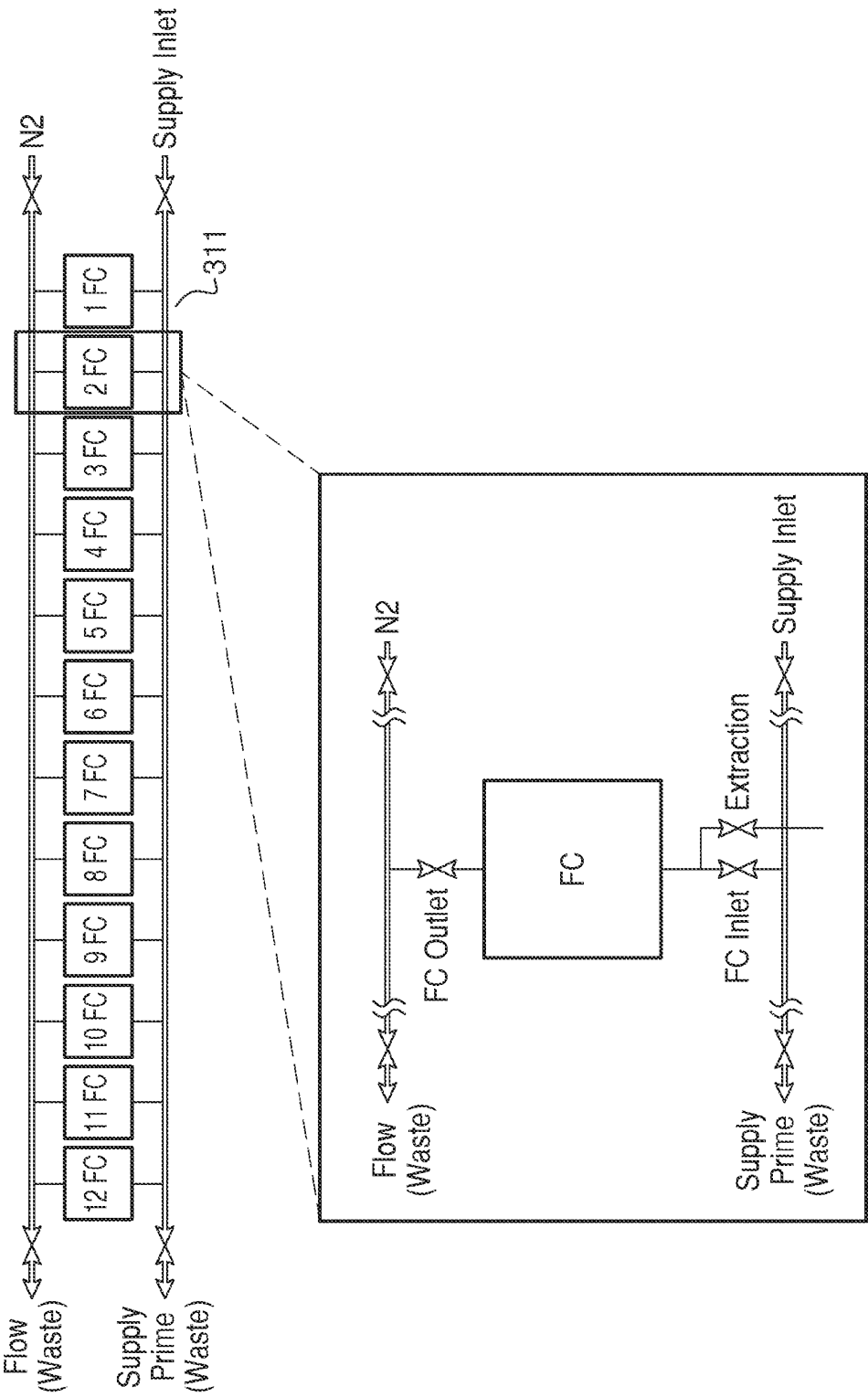


FIG. 6

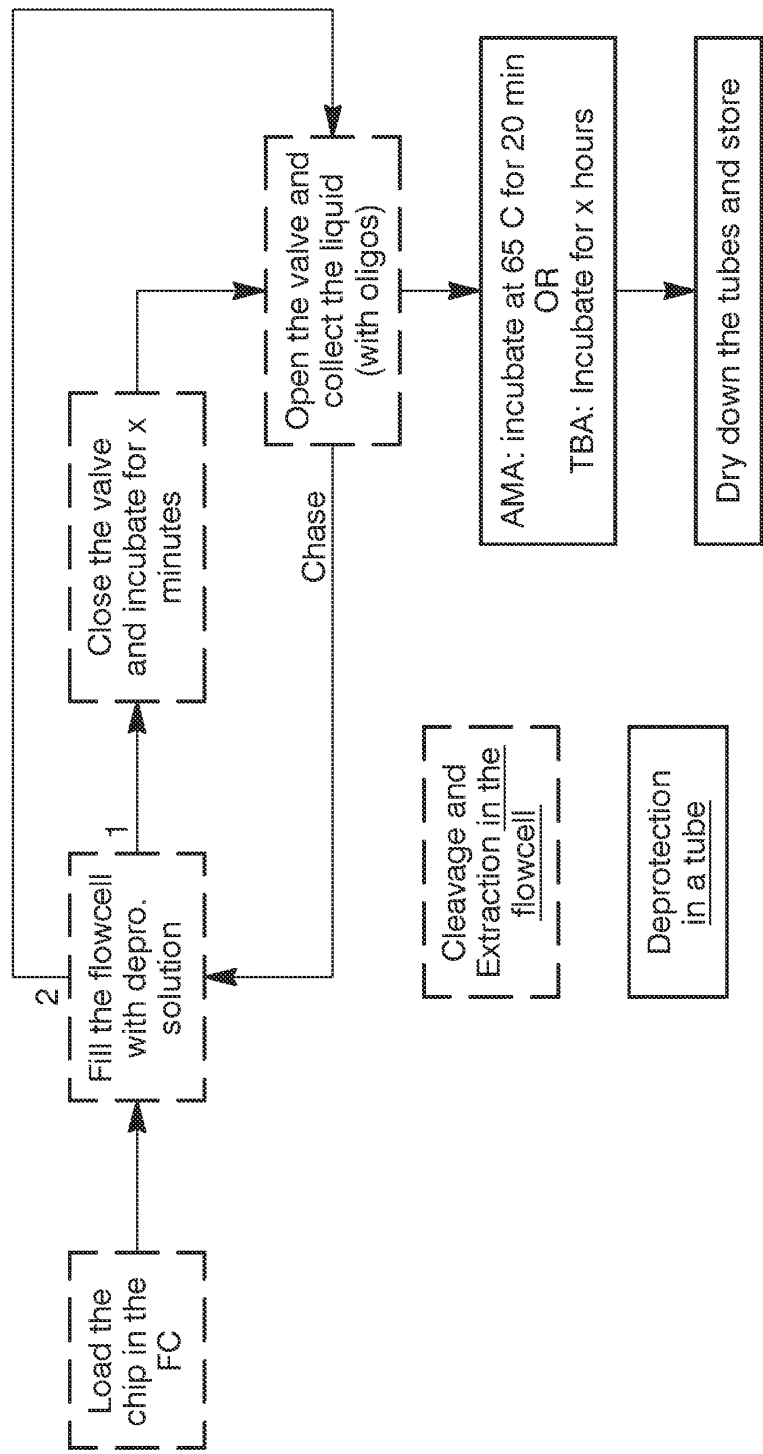


FIG. 7

19/29

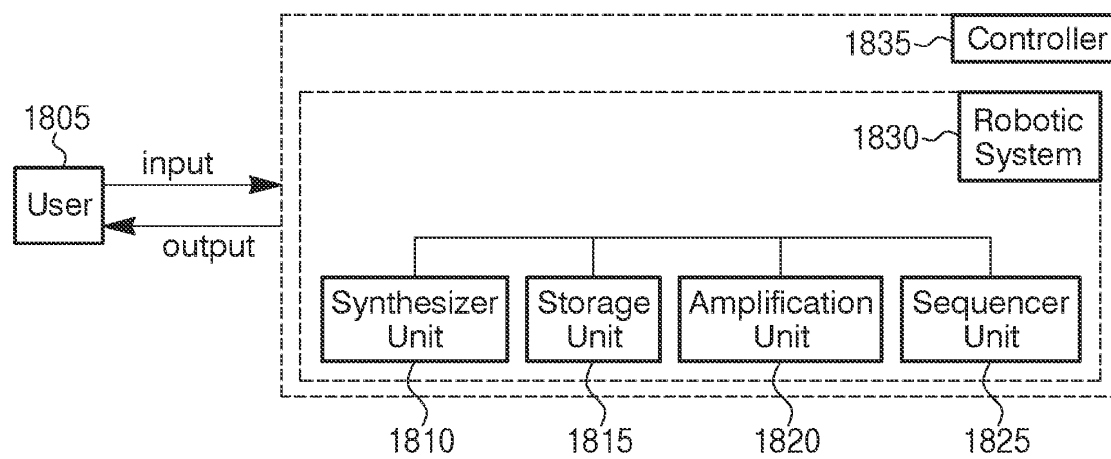


FIG. 8



FIG. 9A



FIG. 9B



FIG. 9C



FIG. 9D



FIG. 9E

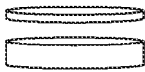


FIG. 9F

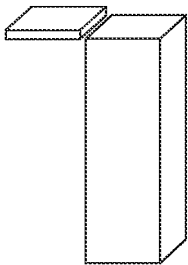


FIG. 9G

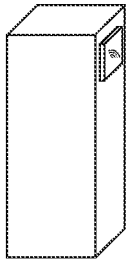


FIG. 9H

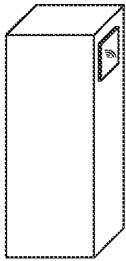


FIG. 9I

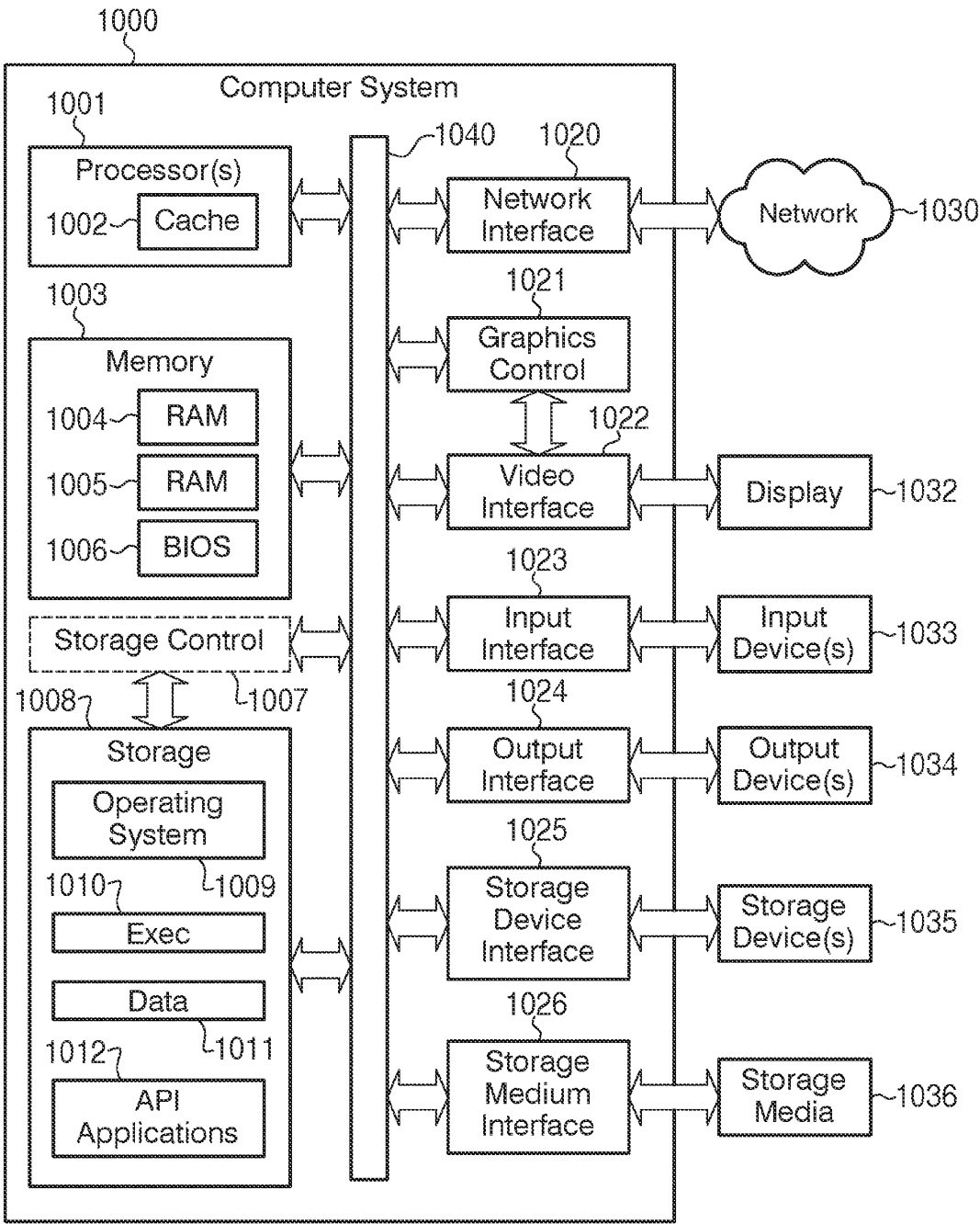


FIG. 10

22/29

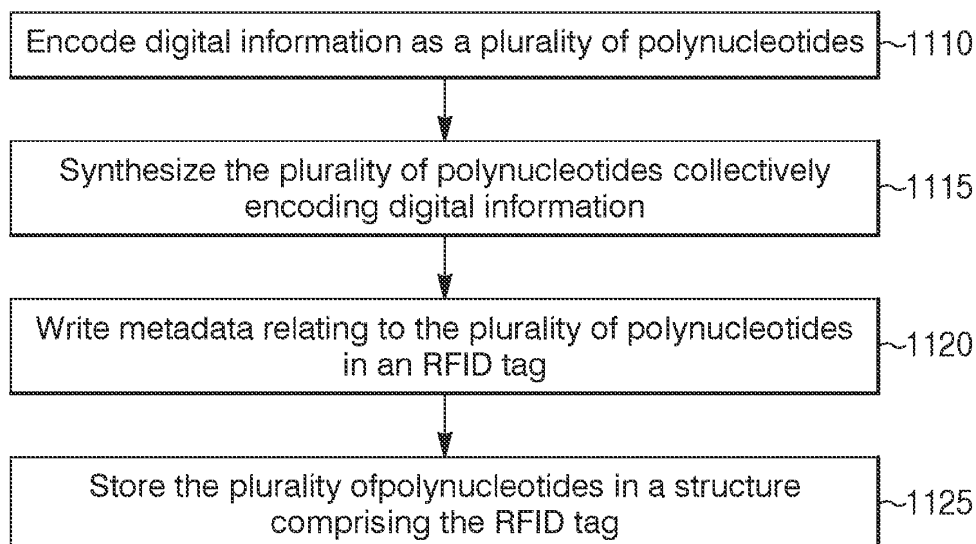


FIG. 11

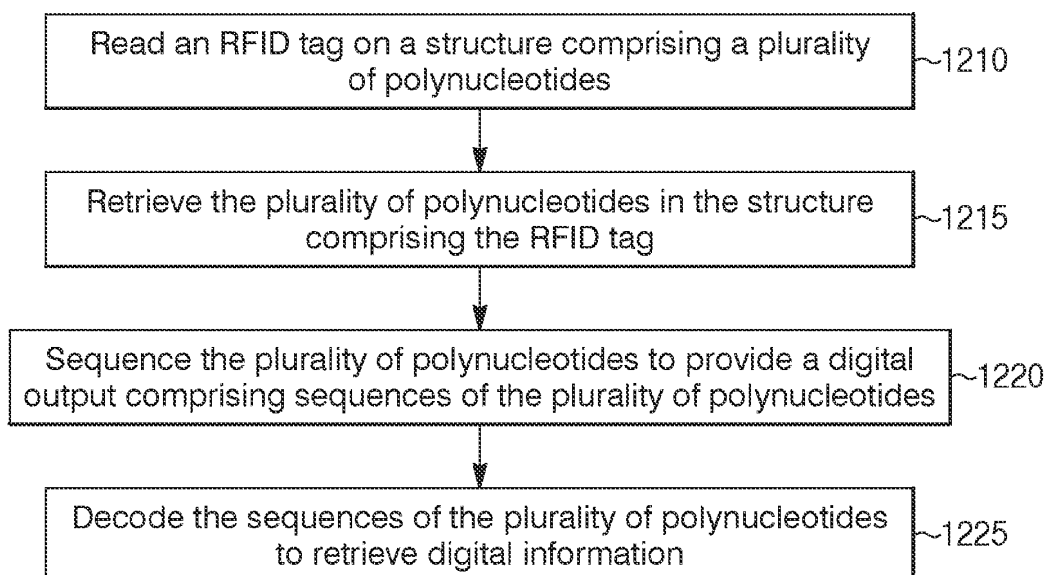


FIG. 12

23/29

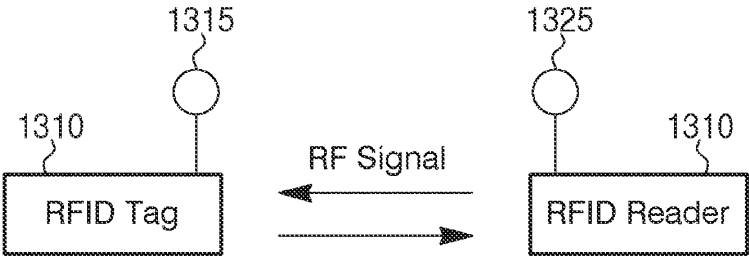


FIG. 13

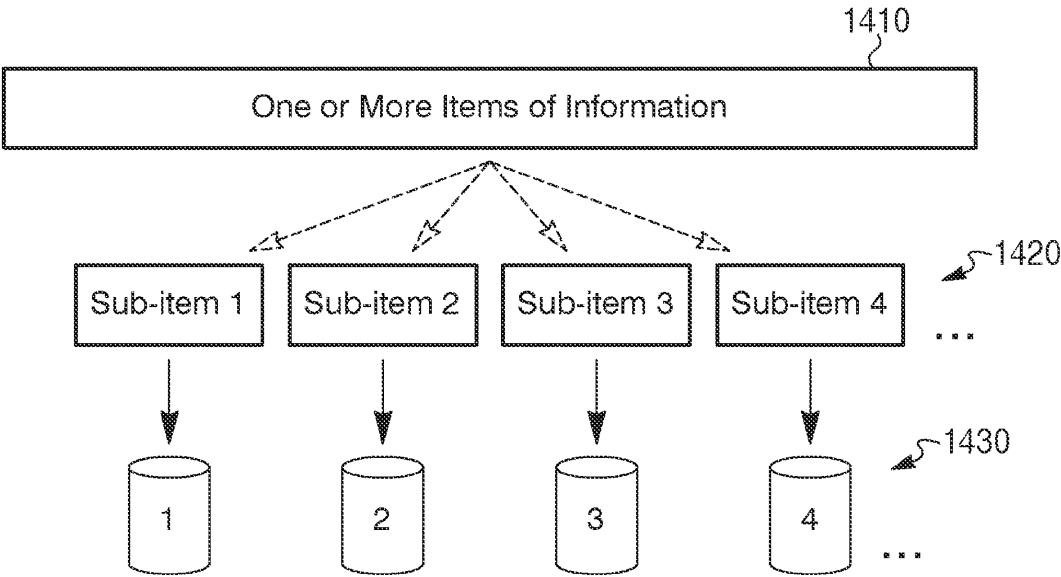


FIG. 14

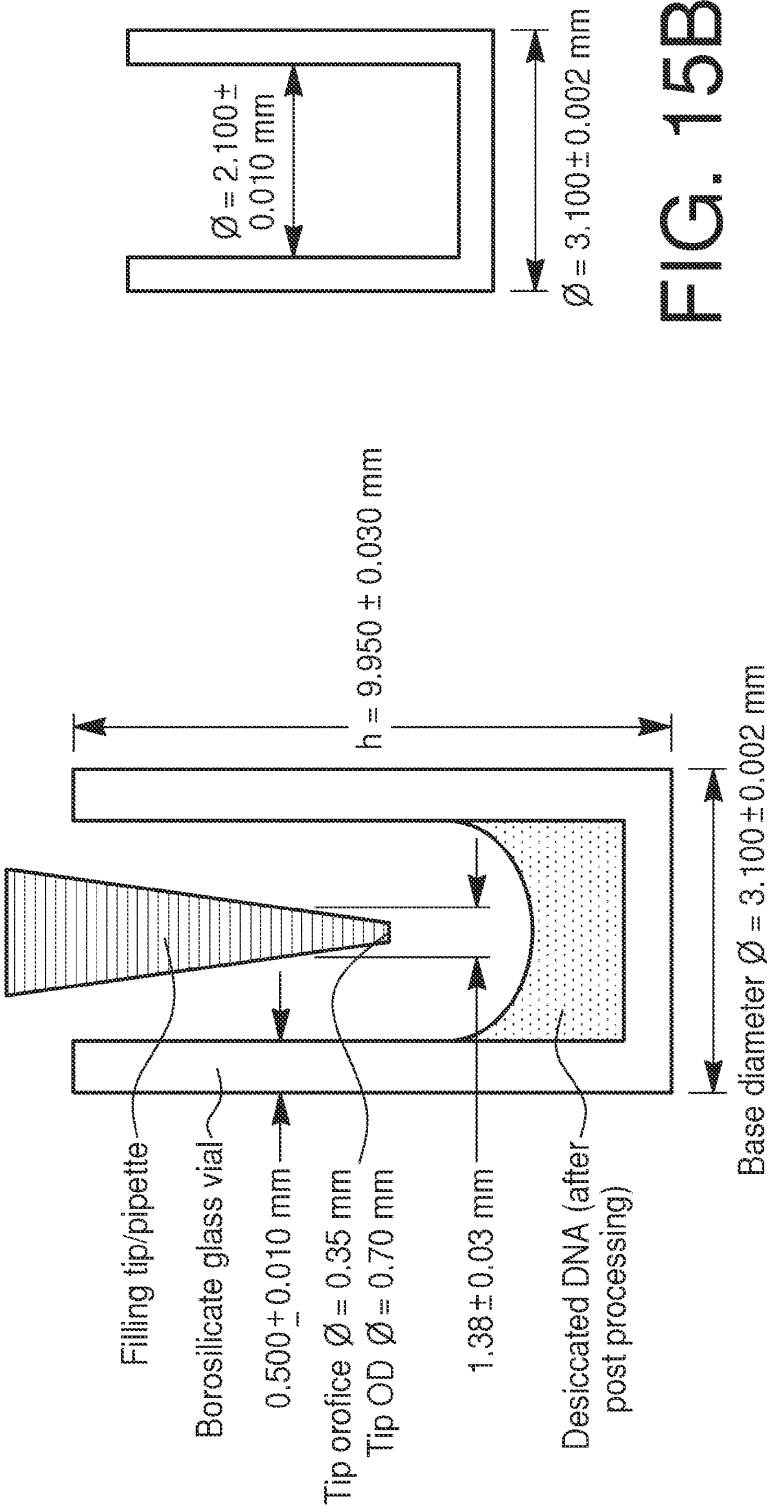


FIG. 15A

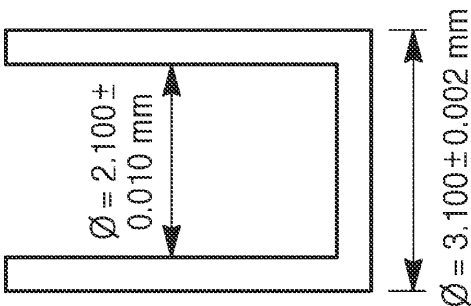


FIG. 15B

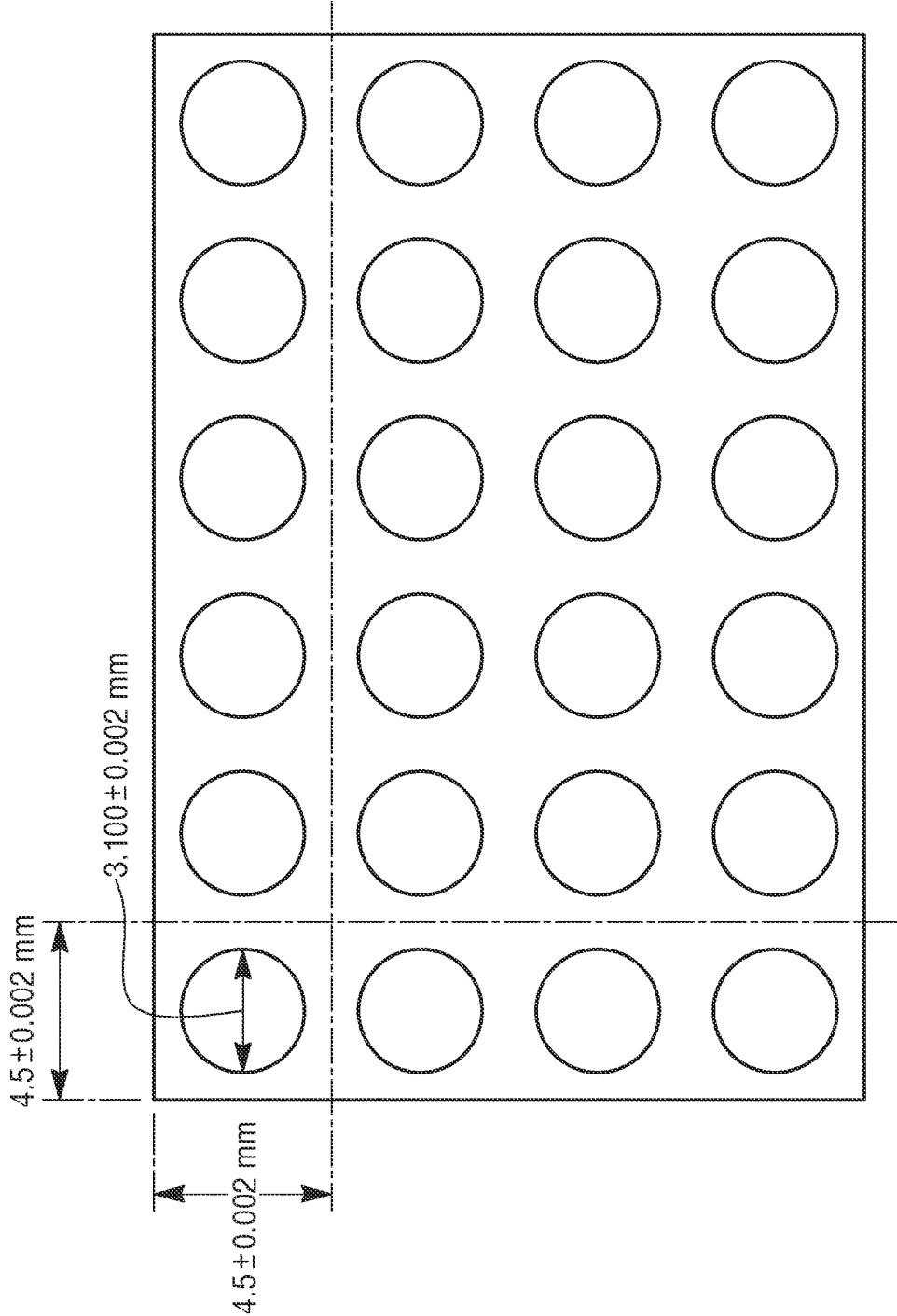


FIG. 16

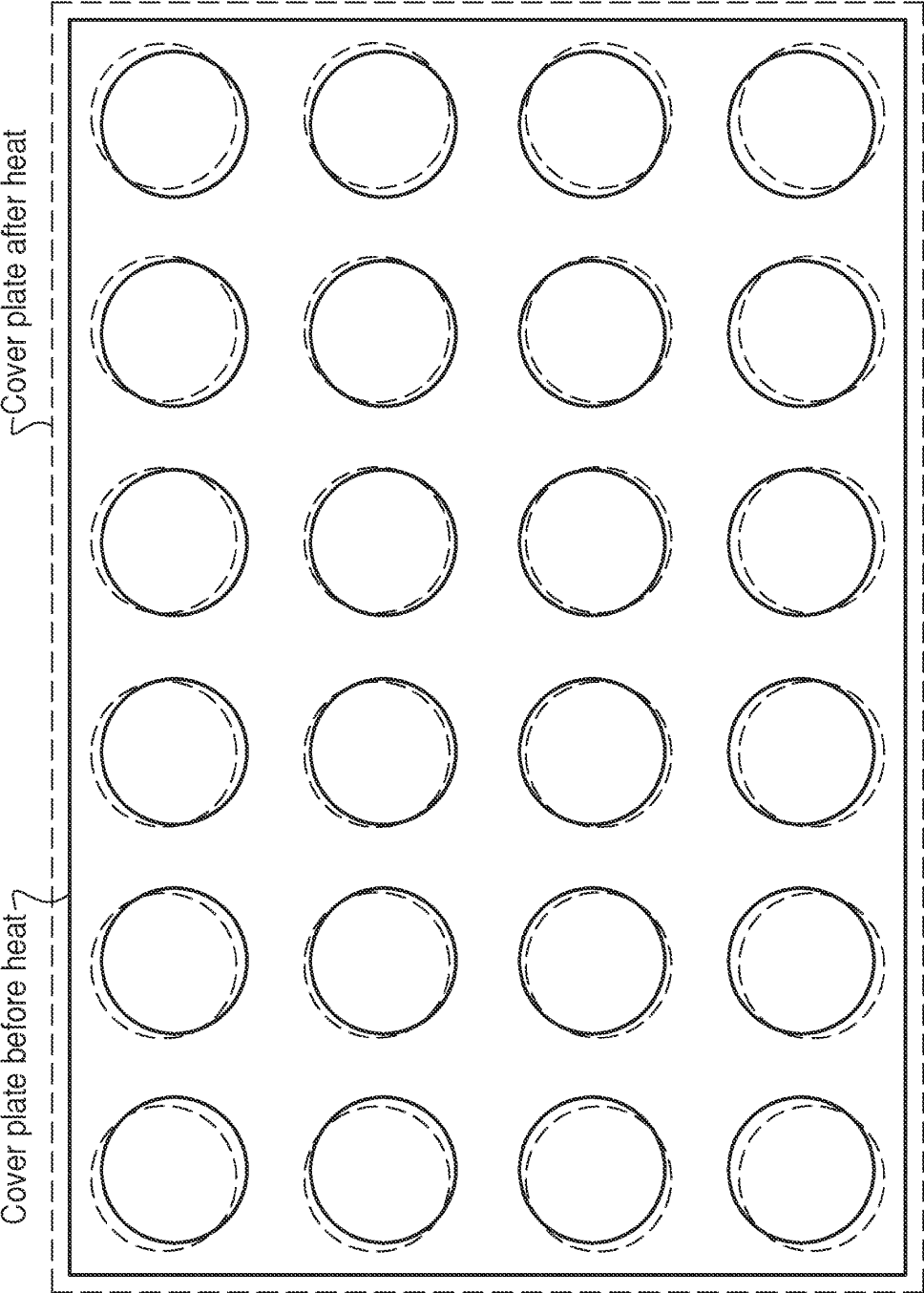
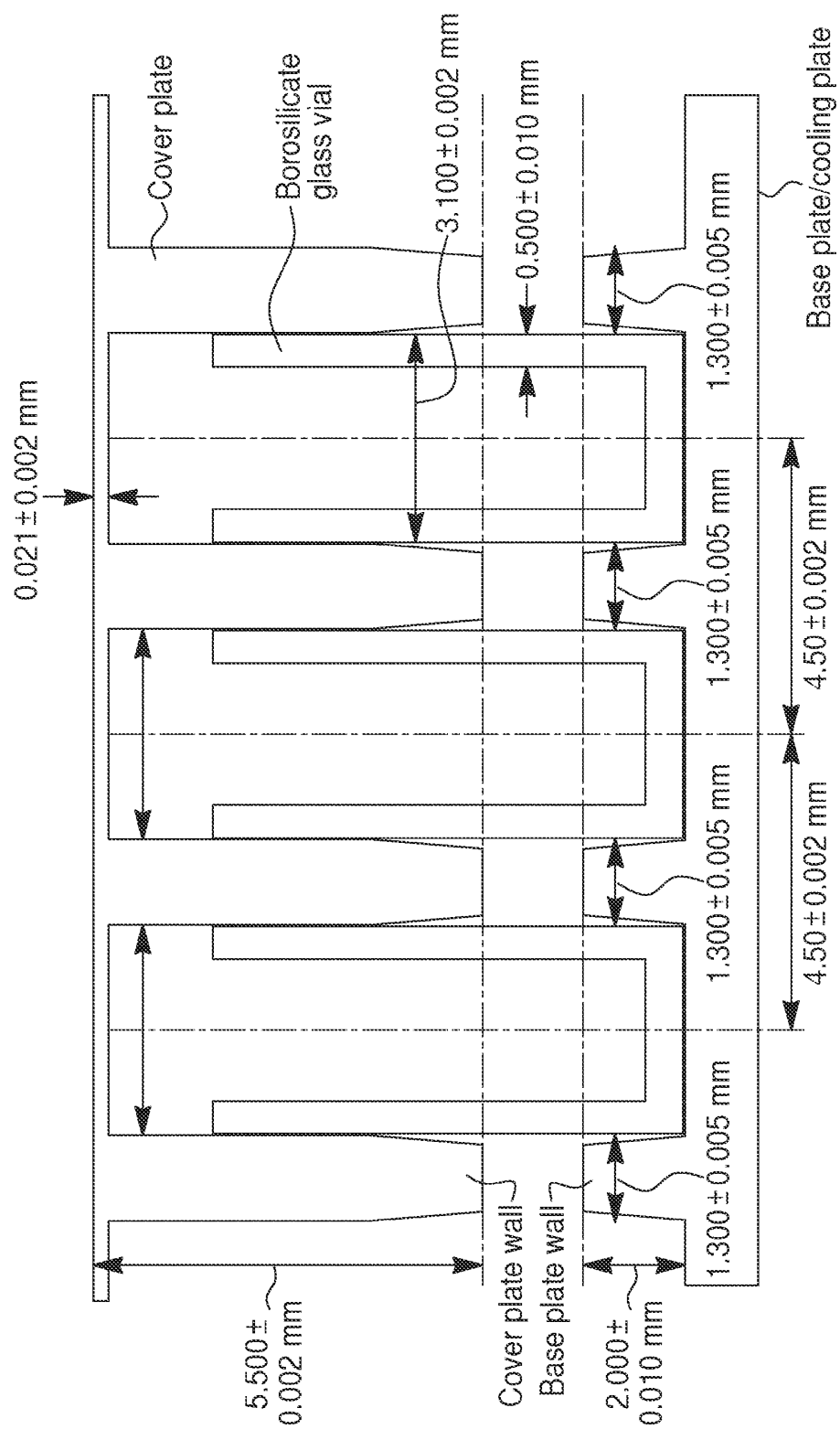


FIG. 17



815.4

Properties/Glass Code		GA-1	GA-4	GA-8	GA-9	GA-12	GA-13	GA-21	GA-34*	GA-44	GA-47
Coefficient of thermal expansion	$\times 10^{-7}/K$	60	63	81	90	73	66	83	45	117	37
	$\times 10^{-3}/cm^3$	4.03	2.70	5.38	5.77	2.95	3.04	5.74	3.93	3.02	2.36
Density											
Transformation point	$^{\circ}C$	445	475	400	360	460	660	375	535	630	645
Deformation point	$^{\circ}C$	505	545	430	385	505	715	402	560	---	715
Softening point	$^{\circ}C$	595	625	490	430	560	850	450	635	---	---
Dielectric constant	1MHz, 25 $^{\circ}C$	8.8	6.2	11.7	14.7	6.7	7.2	---	---	8.5	5.2
$\tan \delta$	1MHz, 25 $^{\circ}C$	12	20	26	17	17	15	---	---	40	8
Volume resistivity	250 $^{\circ}C$	13.1	10.8	12.2	11.3	10.4	14.1	---	---	---	---
Log ρ	350 $^{\circ}C$	11.0	8.0	9.5	---	8.3	12.0	---	---	---	---
Main composition (Glass type)		PbO $\cdot$ B $_2$ O $_3$ SiO $_2$	Na $_2$ O $\cdot$ B $_2$ O $_3$ SiO $_2$	PbO $\cdot$ B $_2$ O $_3$ SiO $_2$	PbO $\cdot$ B $_2$ O $_3$ SiO $_2$	Na $_2$ O $\cdot$ ZnO $\cdot$ B $_2$ O $_3$	CaO $\cdot$ BaO $\cdot$ SiO $_2$	PbO $\cdot$ B $_2$ O $_3$ SiO $_2$	PbO $\cdot$ ZnO $\cdot$ B $_2$ O $_3$ SiO $_2$ (devitrifiable)	MgO $\cdot$ B $_2$ O $_3$ SiO $_2$ (devitrifiable)	Al $_2$ O $_3$ B $_2$ O $_3$ SiO $_2$
Color		White/Black	White	White	White	White	White	White	Pale Purple	White	White

Properties/Glass Code		GA-50	GA-55	GA-59	GA-60	LS-0500	BG-0600	BG-0700	BG-0800	BG-0900	BG-1300
Coefficient of thermal expansion	$\times 10^{-7}/K$	24	87	38	96	83	109	112	98	96	70
	$\times 10^{-3}/cm^3$	2.15	4.54	3.80	2.88	3.06	6.96	7.29	5.76	6.74	5.23
Density											
Transformation point	$^{\circ}C$	495	700	550	640	495	365	350	435	390	497
Deformation point	$^{\circ}C$	600	730			535	395	385	475	420	546
Softening point	$^{\circ}C$	825		645		585	430	410	510	460	615
Dielectric constant	1MHz, 25 $^{\circ}C$	4.1	26.0		7.2	7.6	23.6	410	16.2	22.4	13.4
$\tan \delta$	1MHz, 25 $^{\circ}C$	20	25		35	138	19	410	29	17	17
Volume resistivity	250 $^{\circ}C$	12.4				9.2	9.3	410	10.9	9.7	11.5
Log ρ	350 $^{\circ}C$					7.4	7.4	410	8.8	7.9	9.4
Main composition (Glass type)		B $_2$ O $_3$ SiO $_2$	Na $_2$ O $\cdot$ TiO $_2$ $\cdot$ SiO $_2$	ZnO $\cdot$ B $_2$ O $_3$ SiO $_2$ (devitrifiable)	MgO $\cdot$ B $_2$ O $_3$ SiO $_2$ (devitrifiable)	Na $_2$ O $\cdot$ B $_2$ O $_3$ SiO $_2$	Bi $_2$ O $_3$ B $_2$ O $_3$	Bi $_2$ O $_3$ B $_2$ O $_3$	Bi $_2$ O $_3$ B $_2$ O $_3$	Bi $_2$ O $_3$ B $_2$ O $_3$	Bi $_2$ O $_3$ SiO $_2$
Color		White	Pale Green	Pale Purple	White	White	Green	Green	White	Green	Light Brown

FIG. 19

29/29

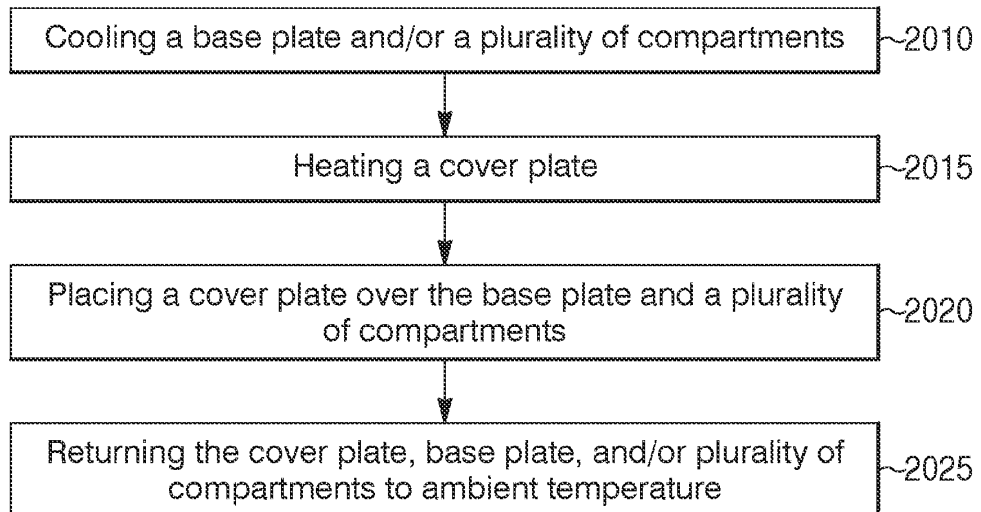


FIG. 20