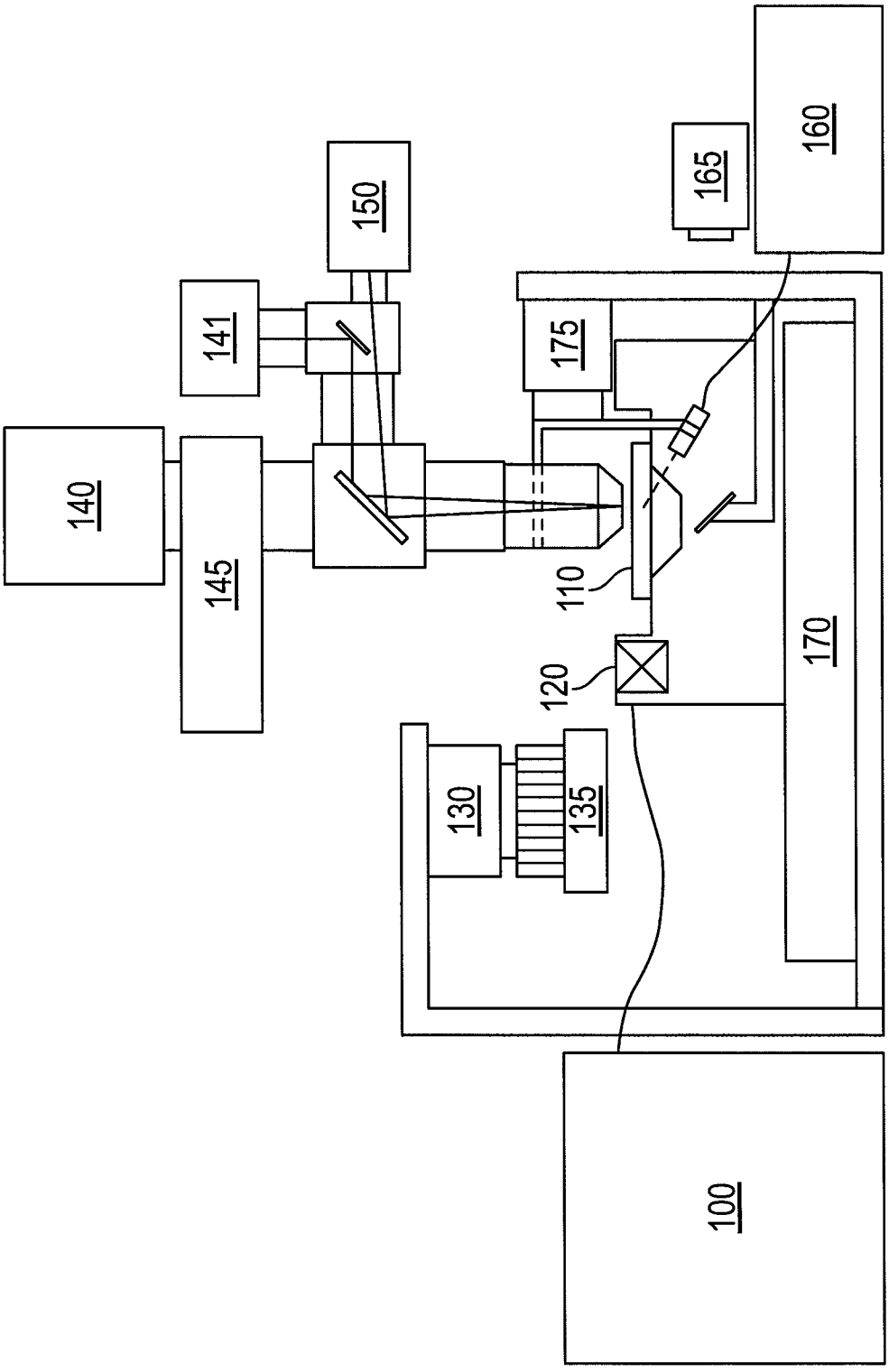


FIG. 1

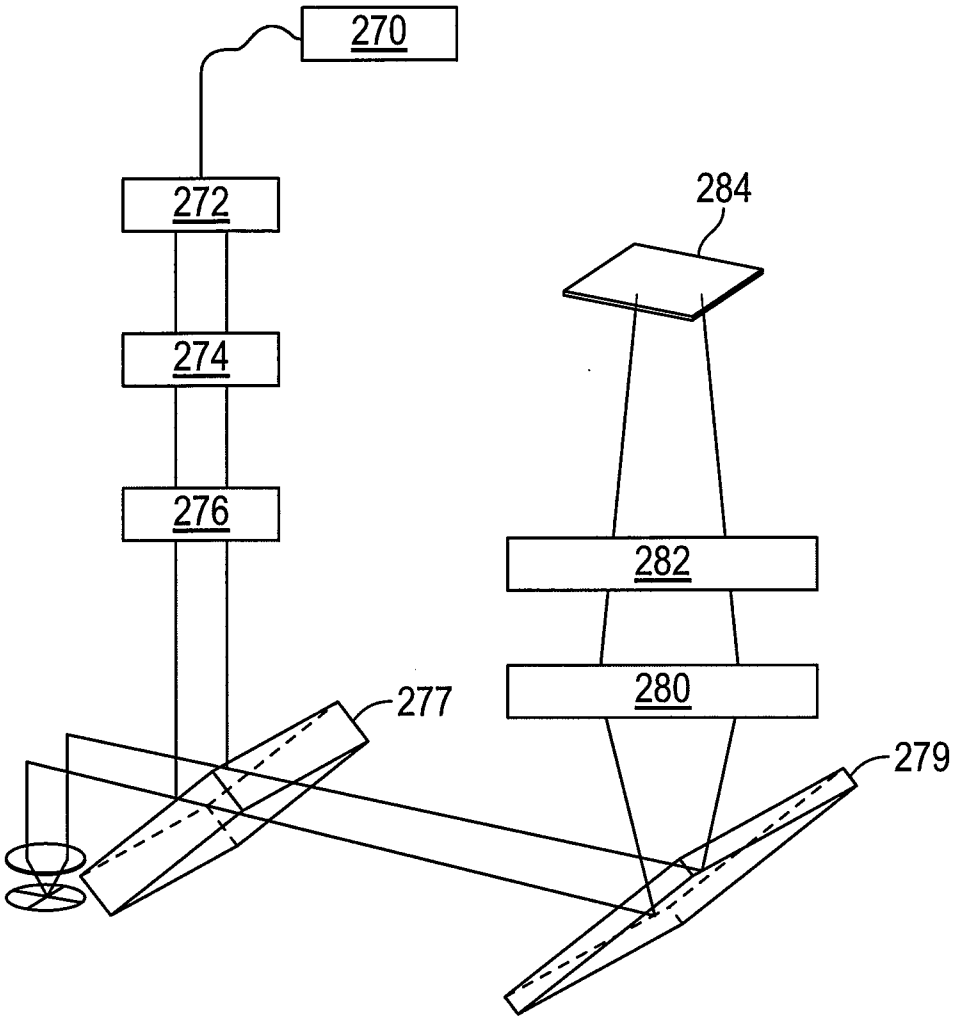


FIG. 2A

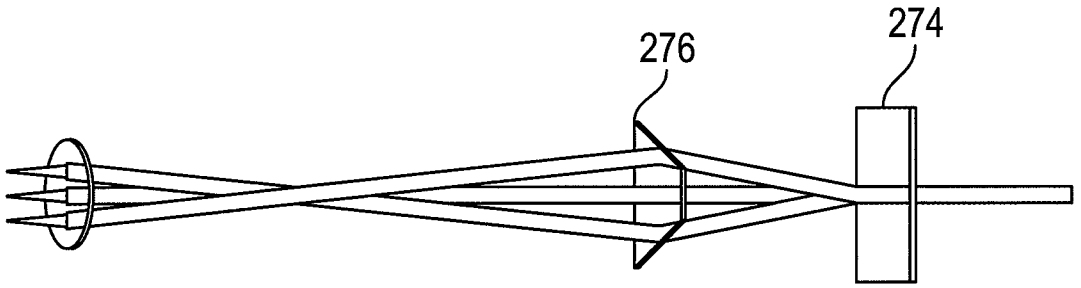


FIG. 2B

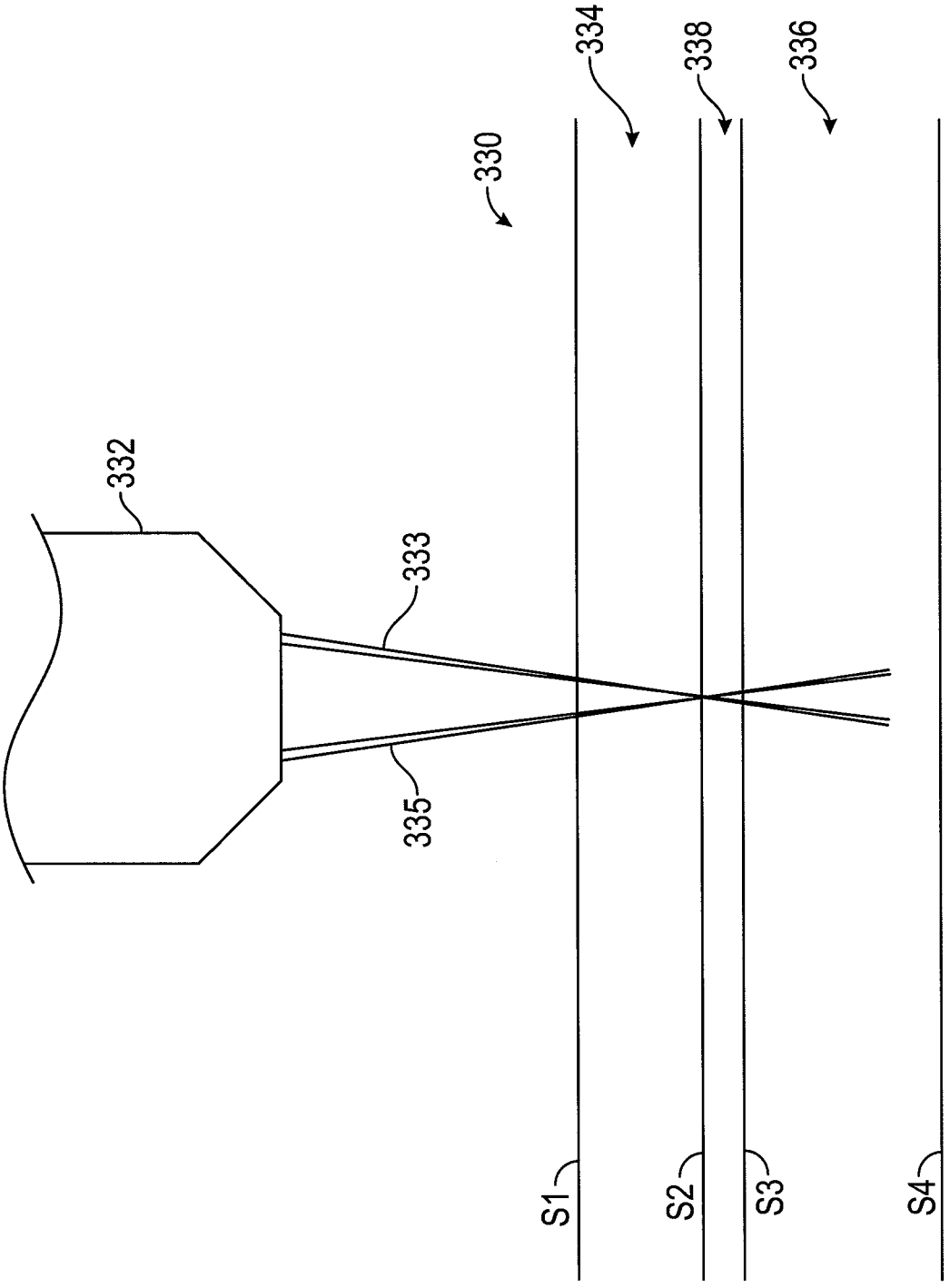


FIG. 3A

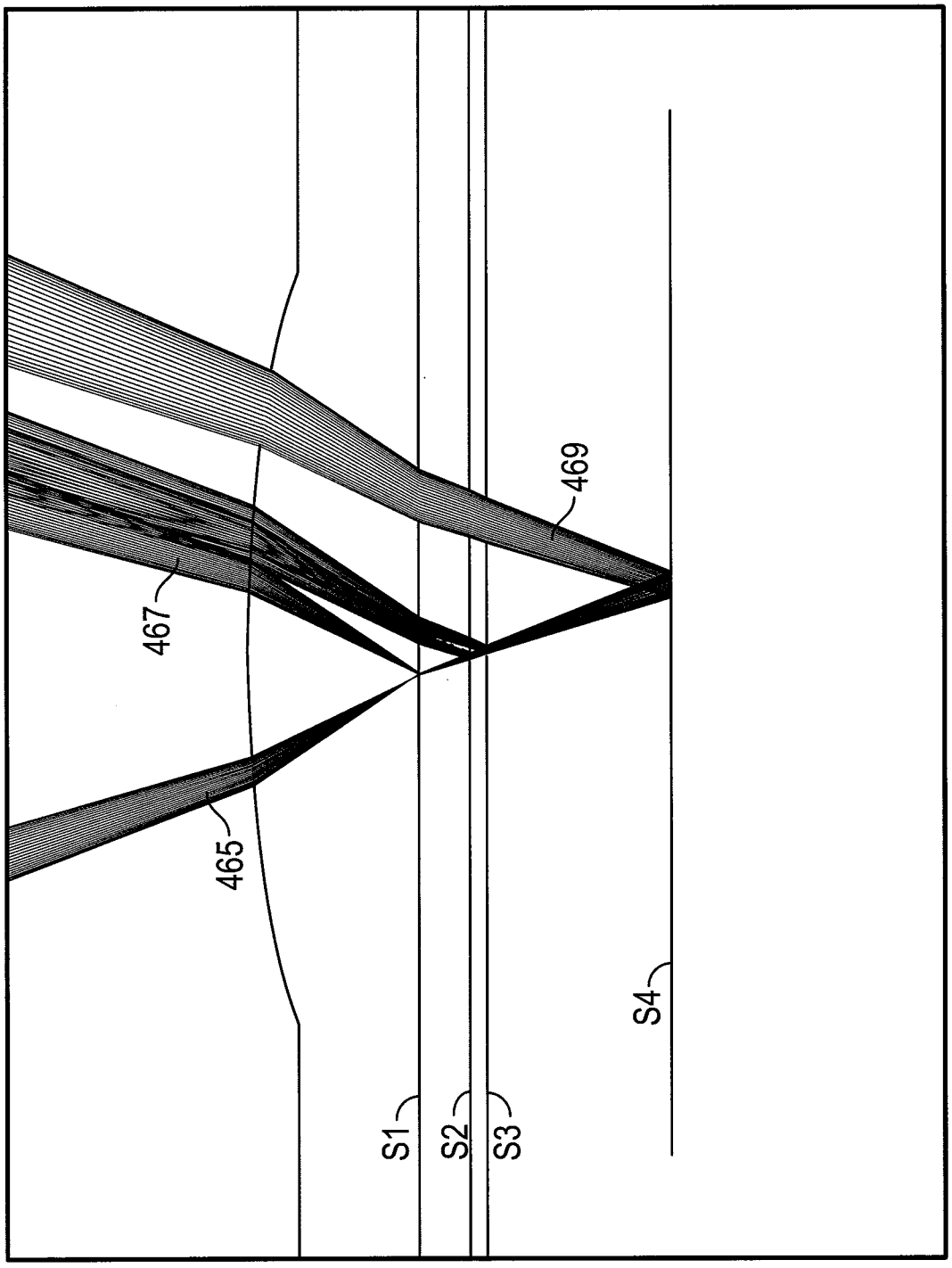


FIG. 3B

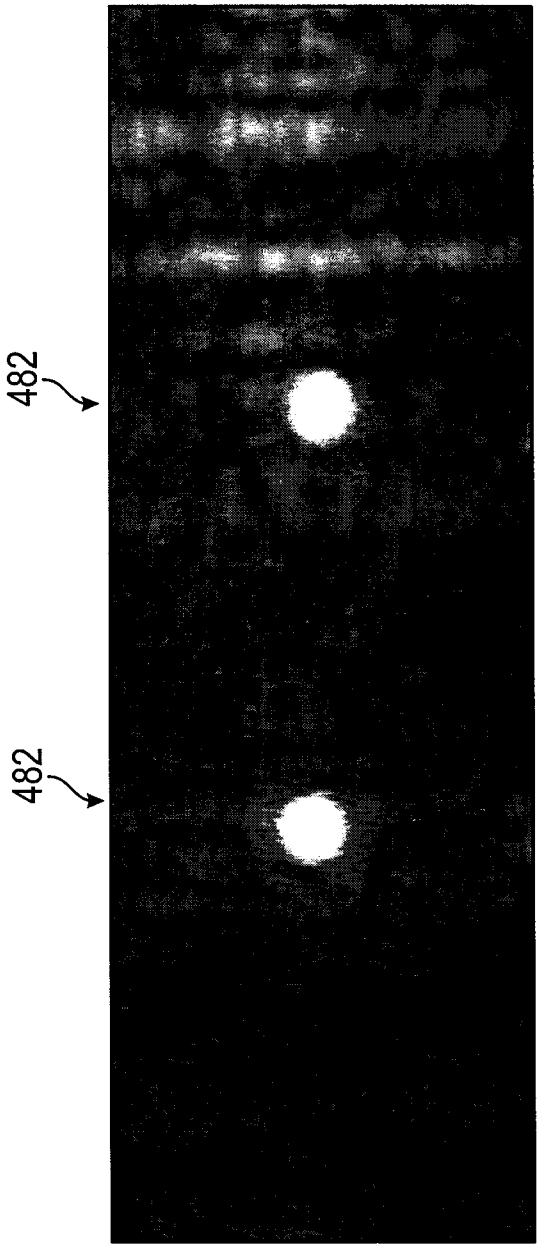


FIG. 3C

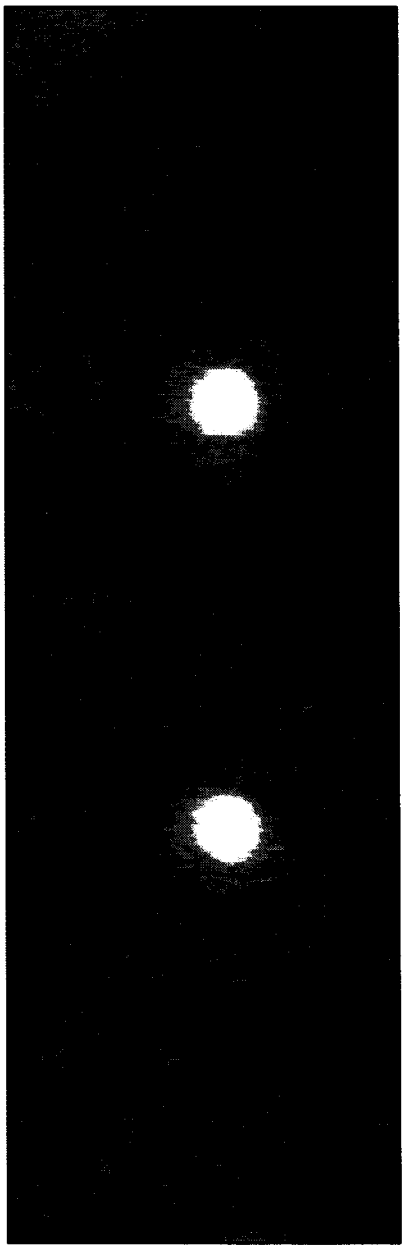


FIG. 3D

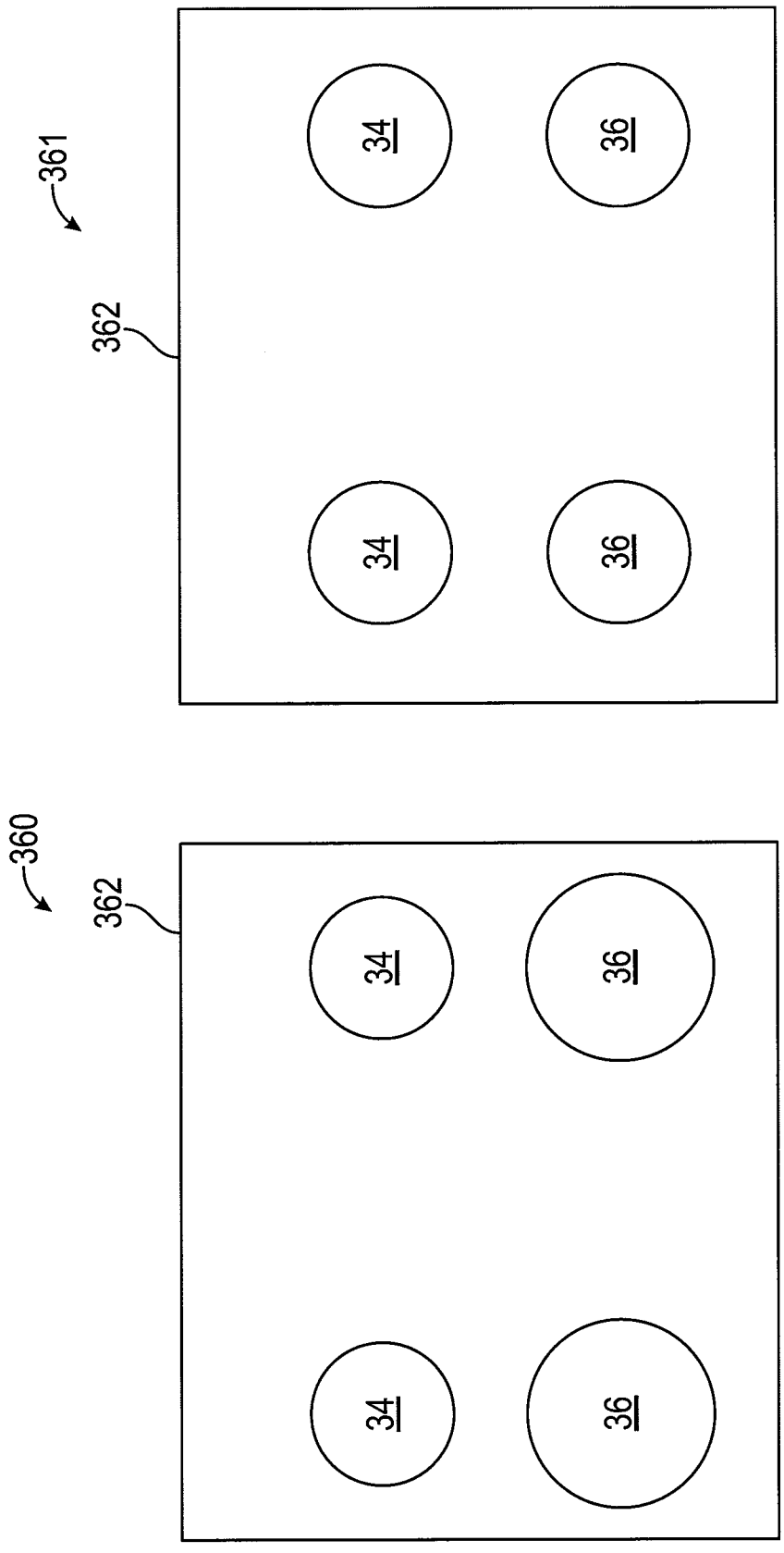


FIG. 4A

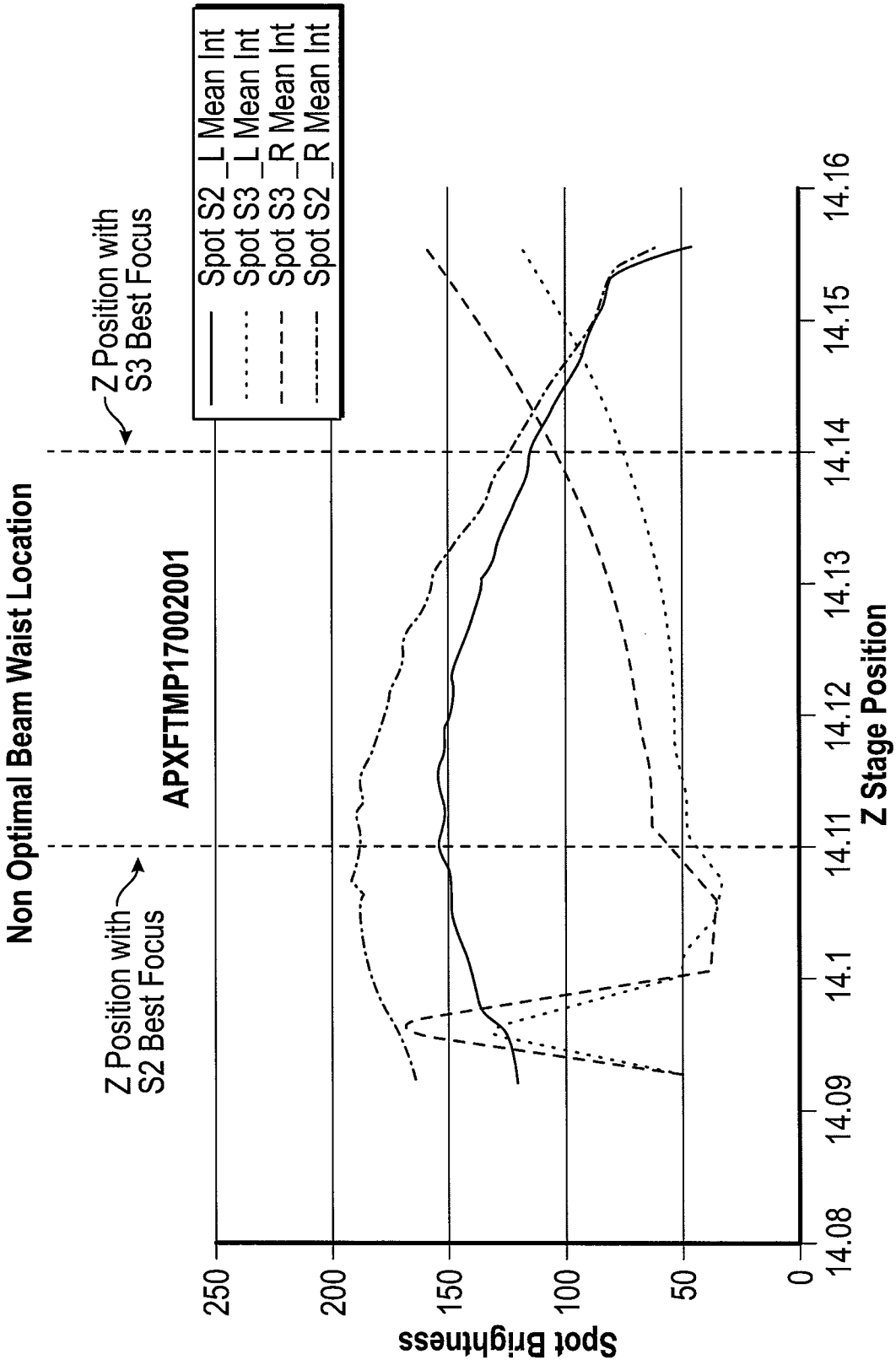

Non Optimal Beam Waist Location
Z Position with S2 Best Focus
Z Position with S3 Best Focus
APXFTMP17002001
Spot S2 _L Mean Int
Spot S3 _L Mean Int
Spot S3 _R Mean Int
Spot S2 _R Mean Int
Spot Brightness
250
200
150
100
50
0
14.08
14.09
14.1
14.11
14.12
14.13
14.14
14.15
14.16
Z Stage Position

FIG. 4B

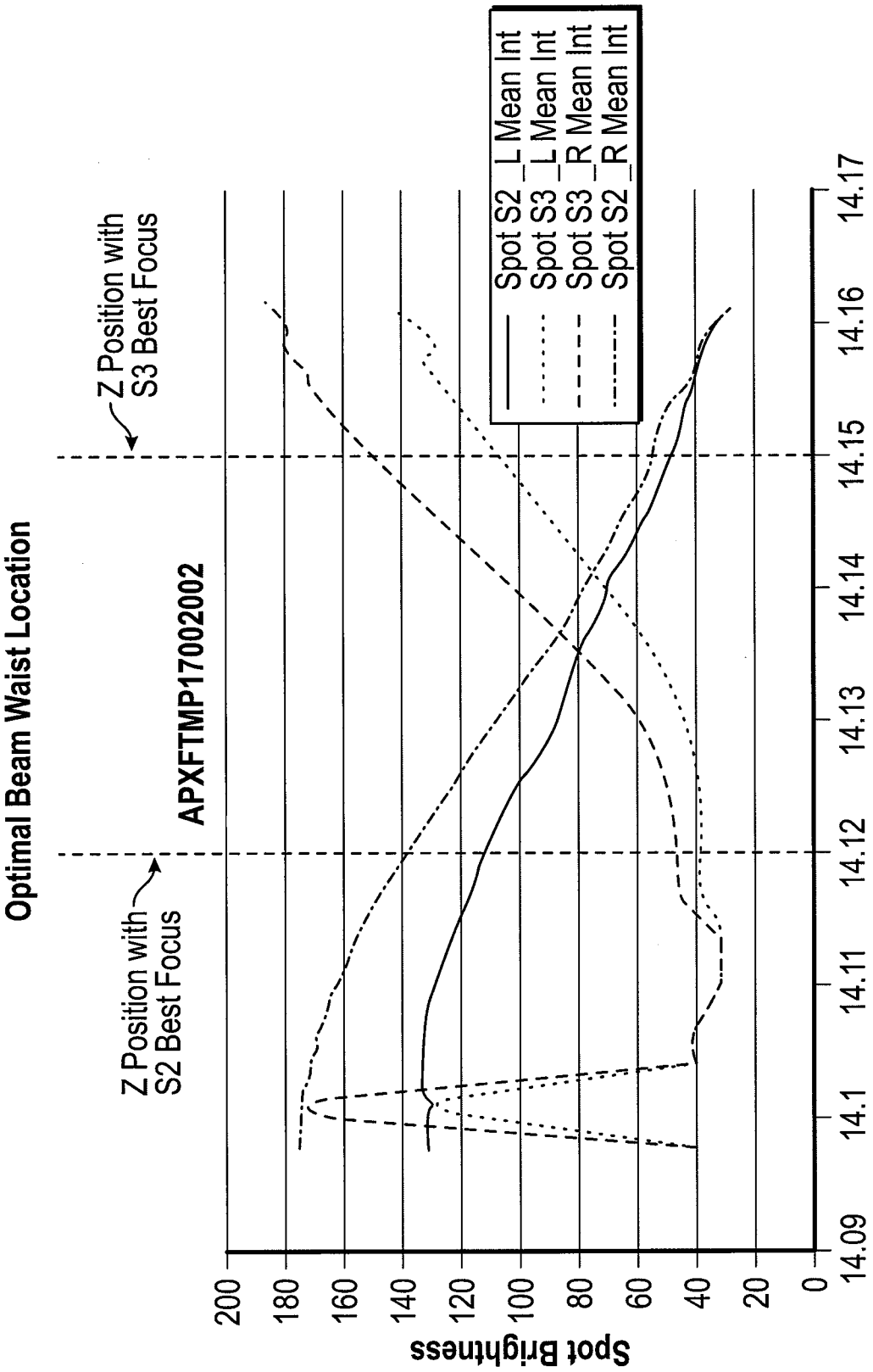

Optimal Beam Waist Location
Z Position with S2 Best Focus
Z Position with S3 Best Focus
APXFTMP17002002
Spot S2 _L Mean Int
Spot S3 _L Mean Int
Spot S3 _R Mean Int
Spot S2 _R Mean Int
Spot Brightness
Z Stage Position
200
180
160
140
120
100
80
60
40
20
0
14.09
14.1
14.11
14.12
14.13
14.14
14.15
14.16
14.17

FIG. 4C

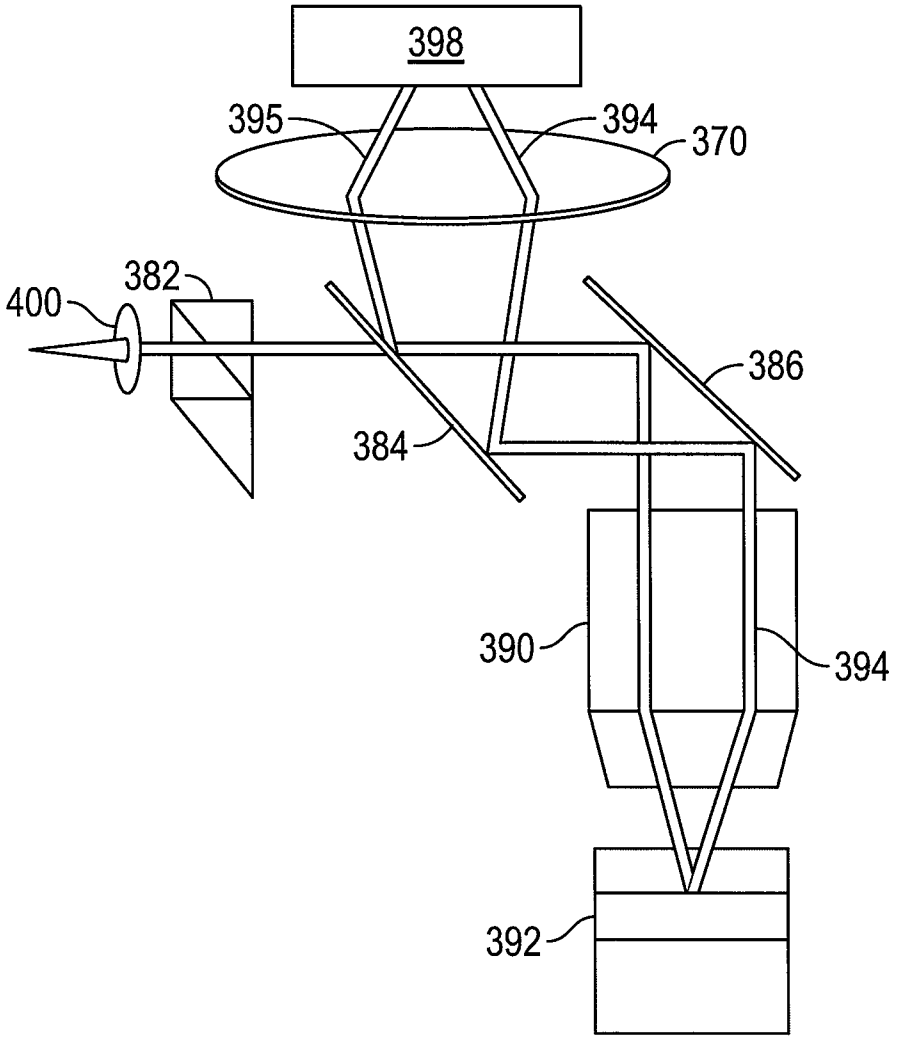


FIG. 5A

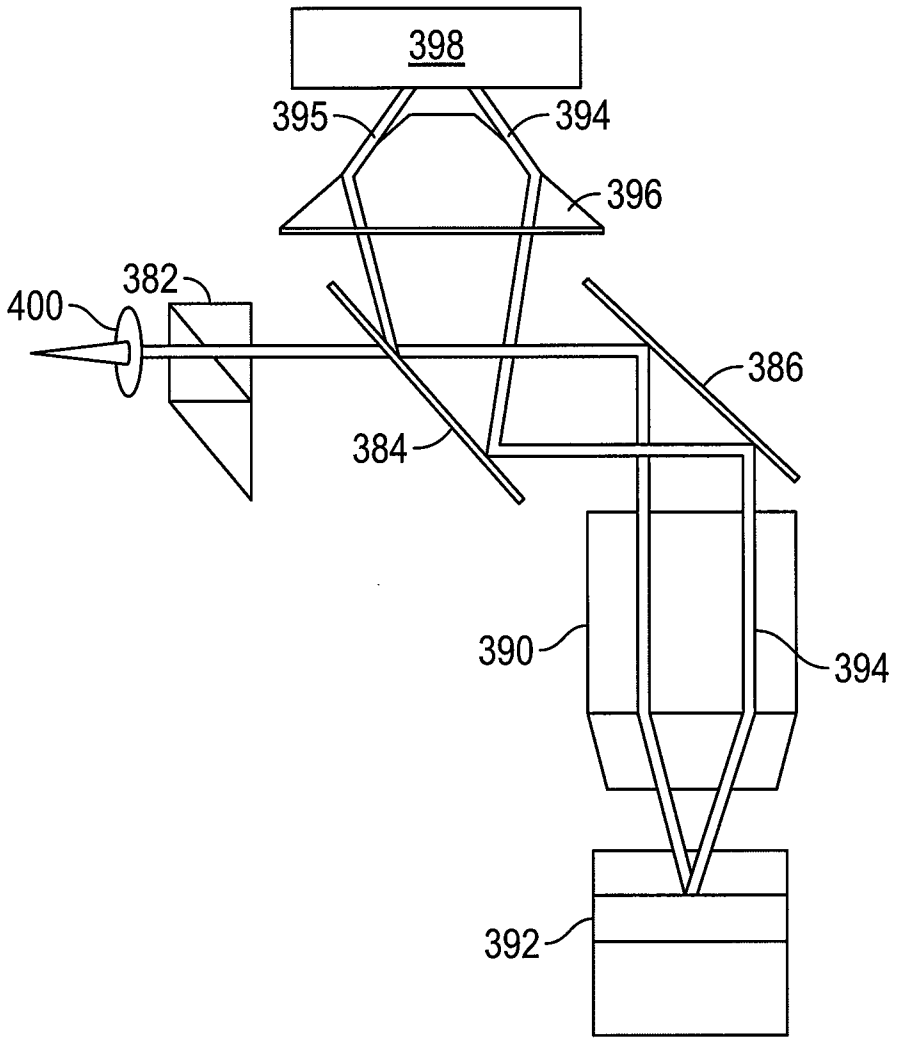


FIG. 5B

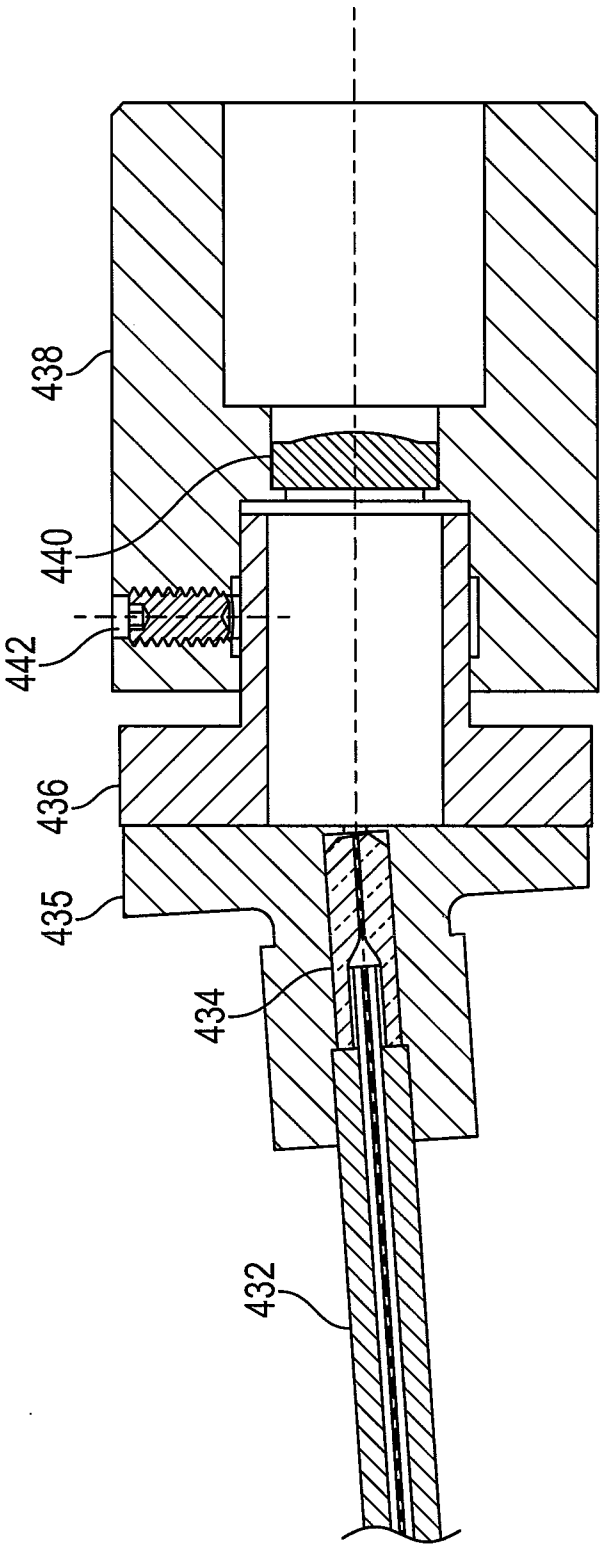


FIG. 6

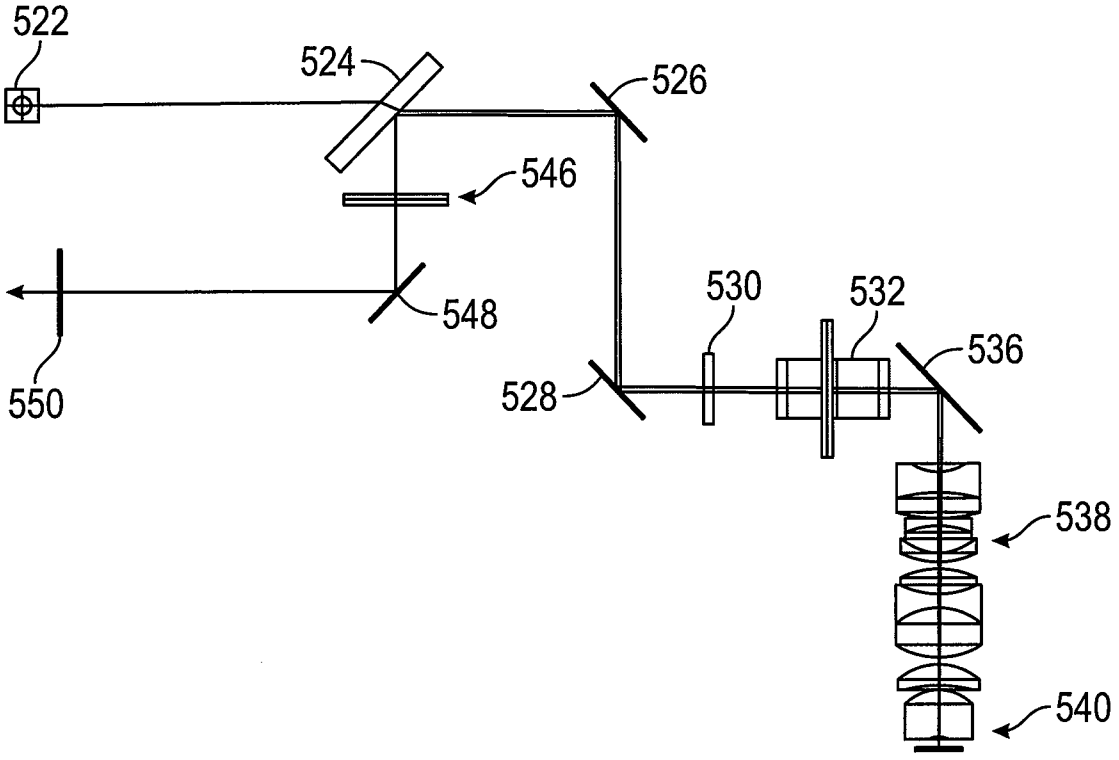


FIG. 7

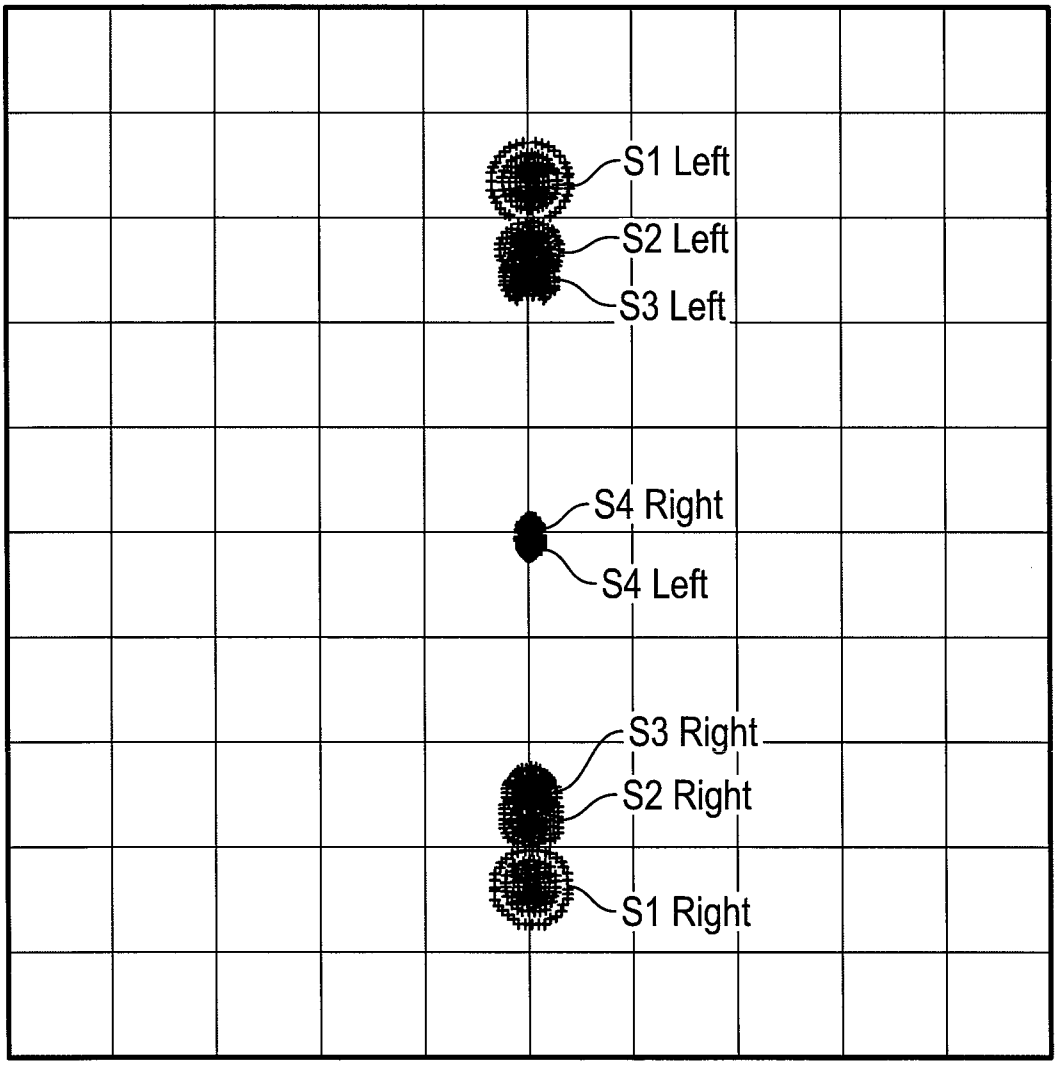

S1 Left
S2 Left
S3 Left
S4 Right
S4 Left
S3 Right
S2 Right
S1 Right

FIG. 8

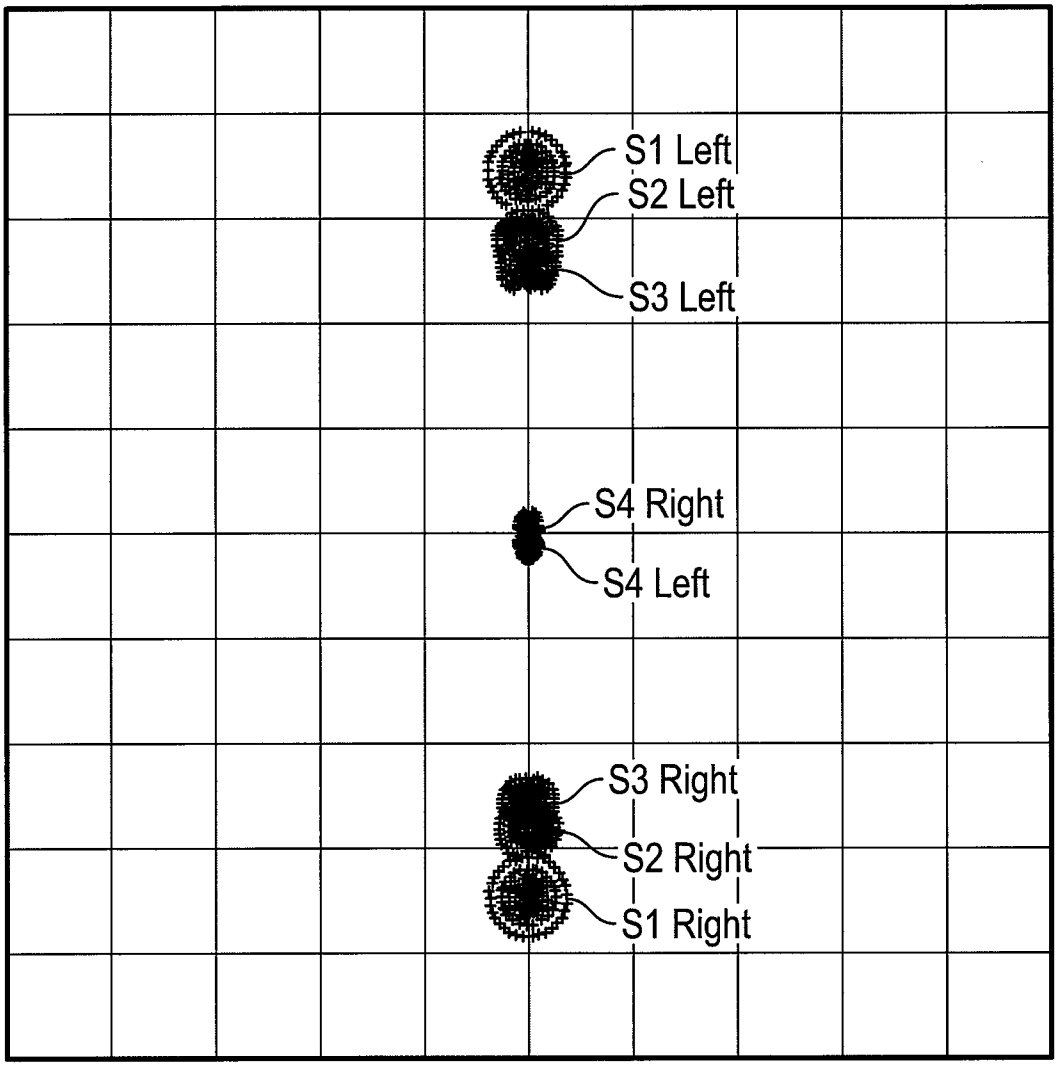

S1 Left
S2 Left
S3 Left
S4 Right
S4 Left
S3 Right
S2 Right
S1 Right

FIG. 9

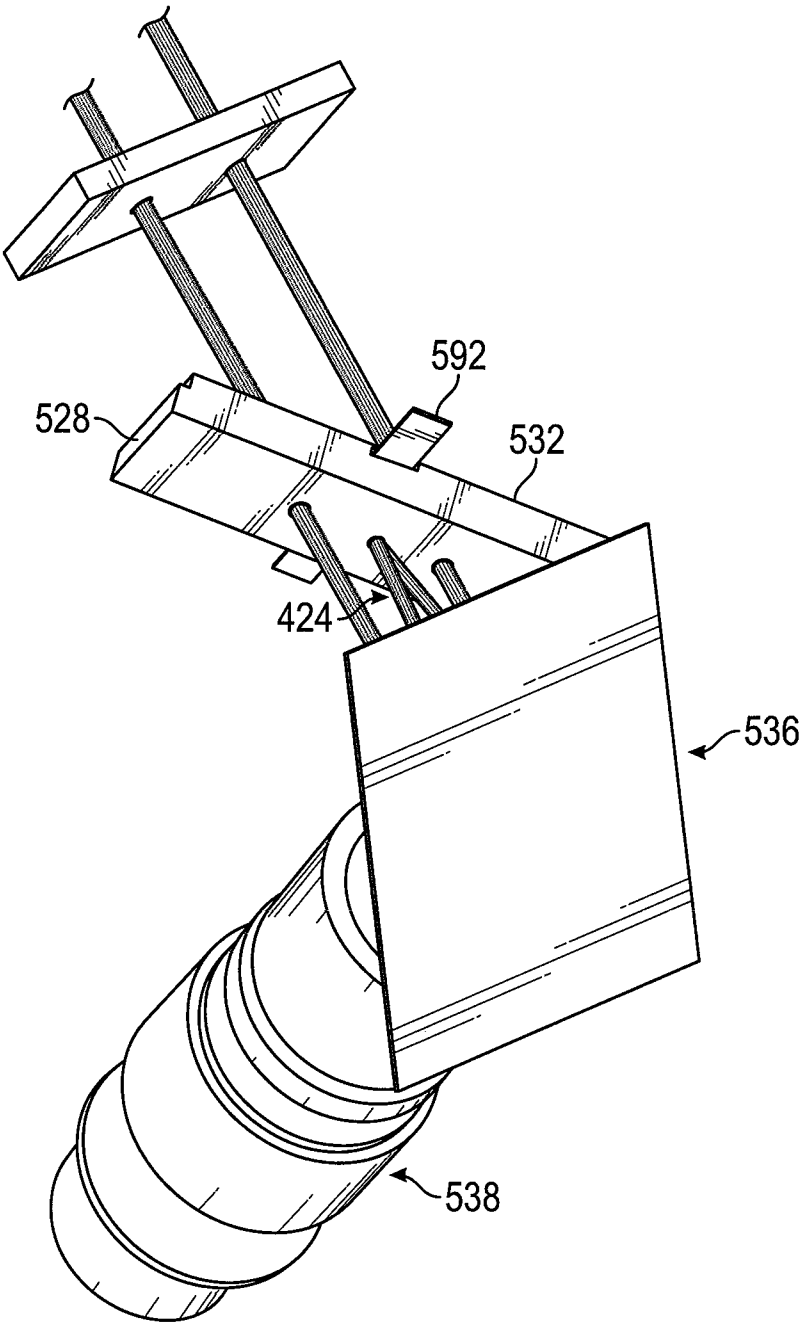


FIG. 10

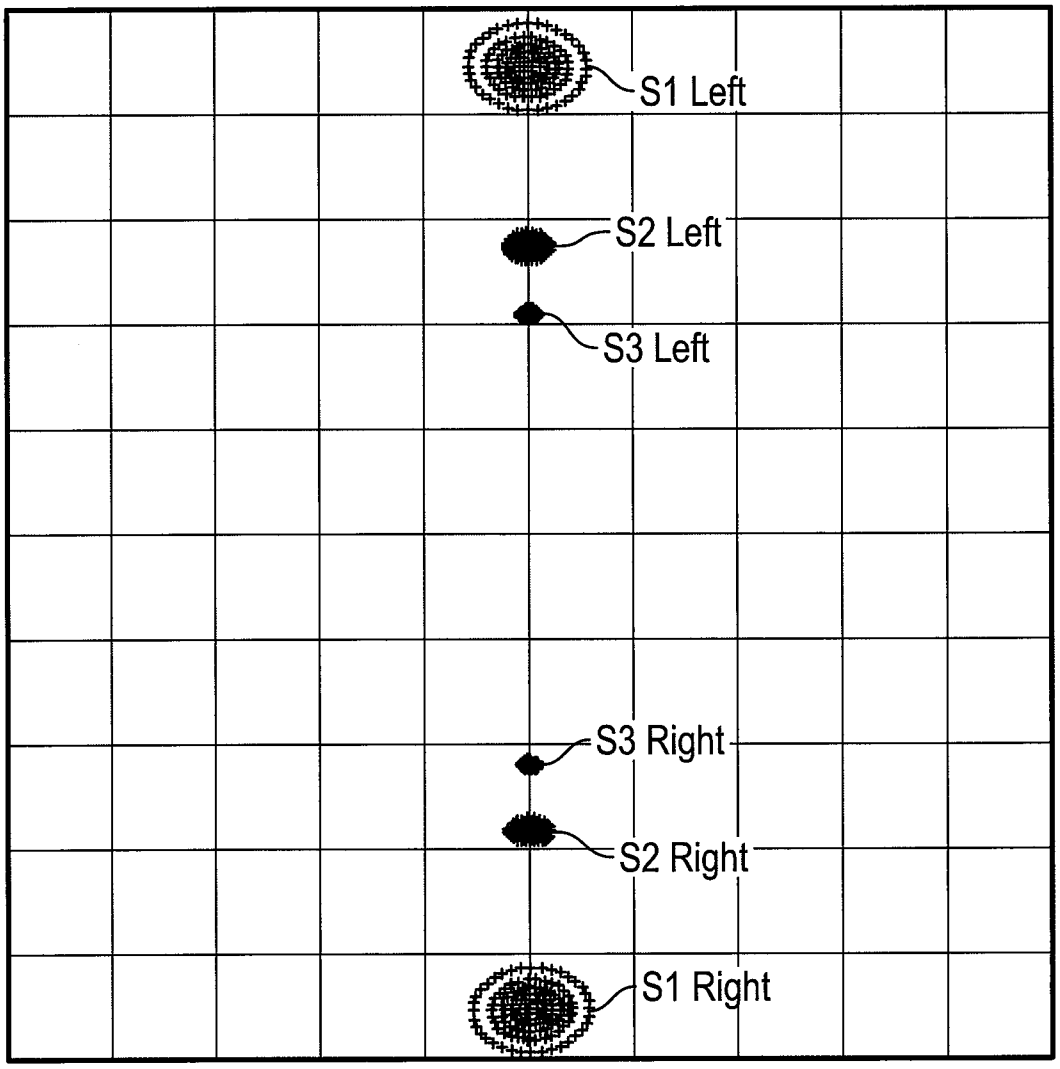


FIG. 11

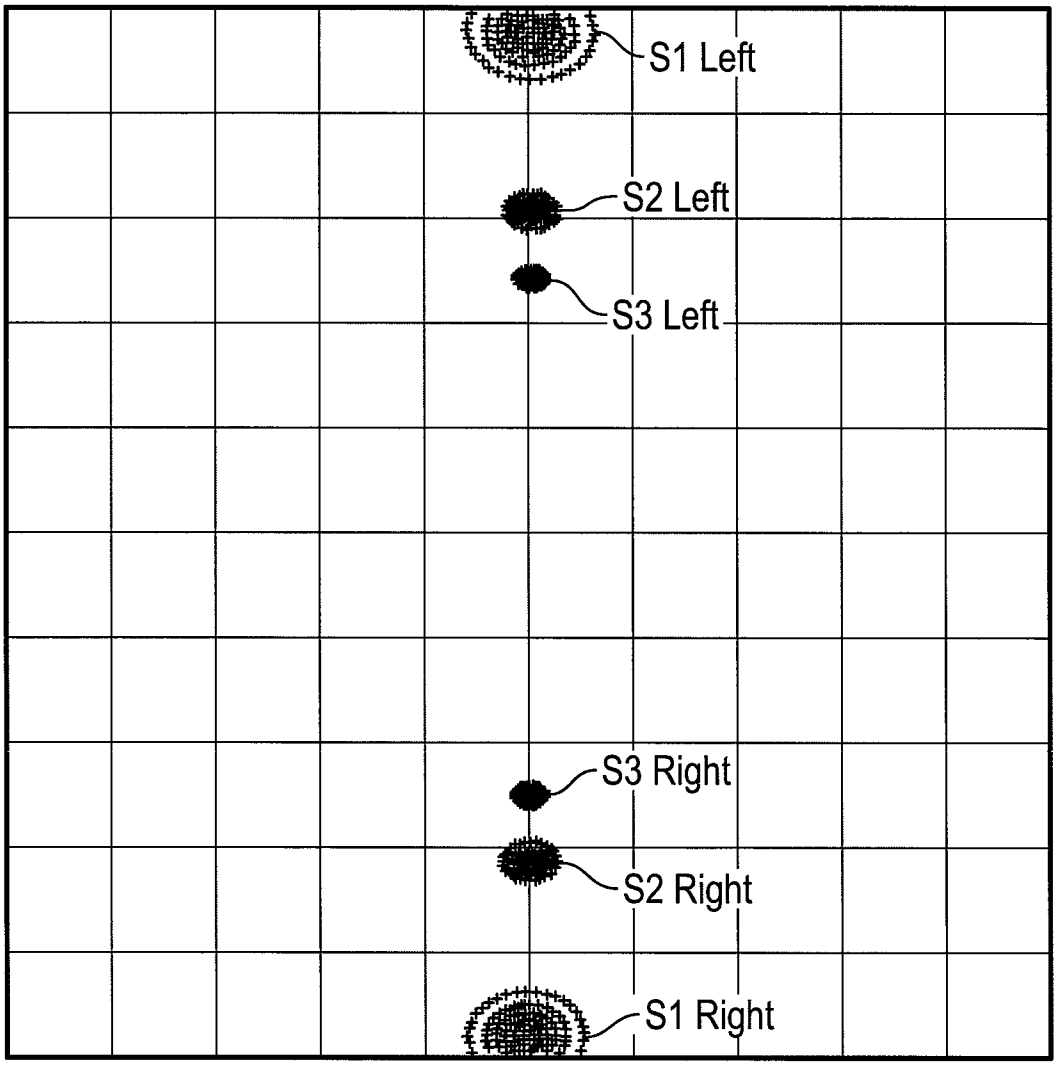


FIG. 12

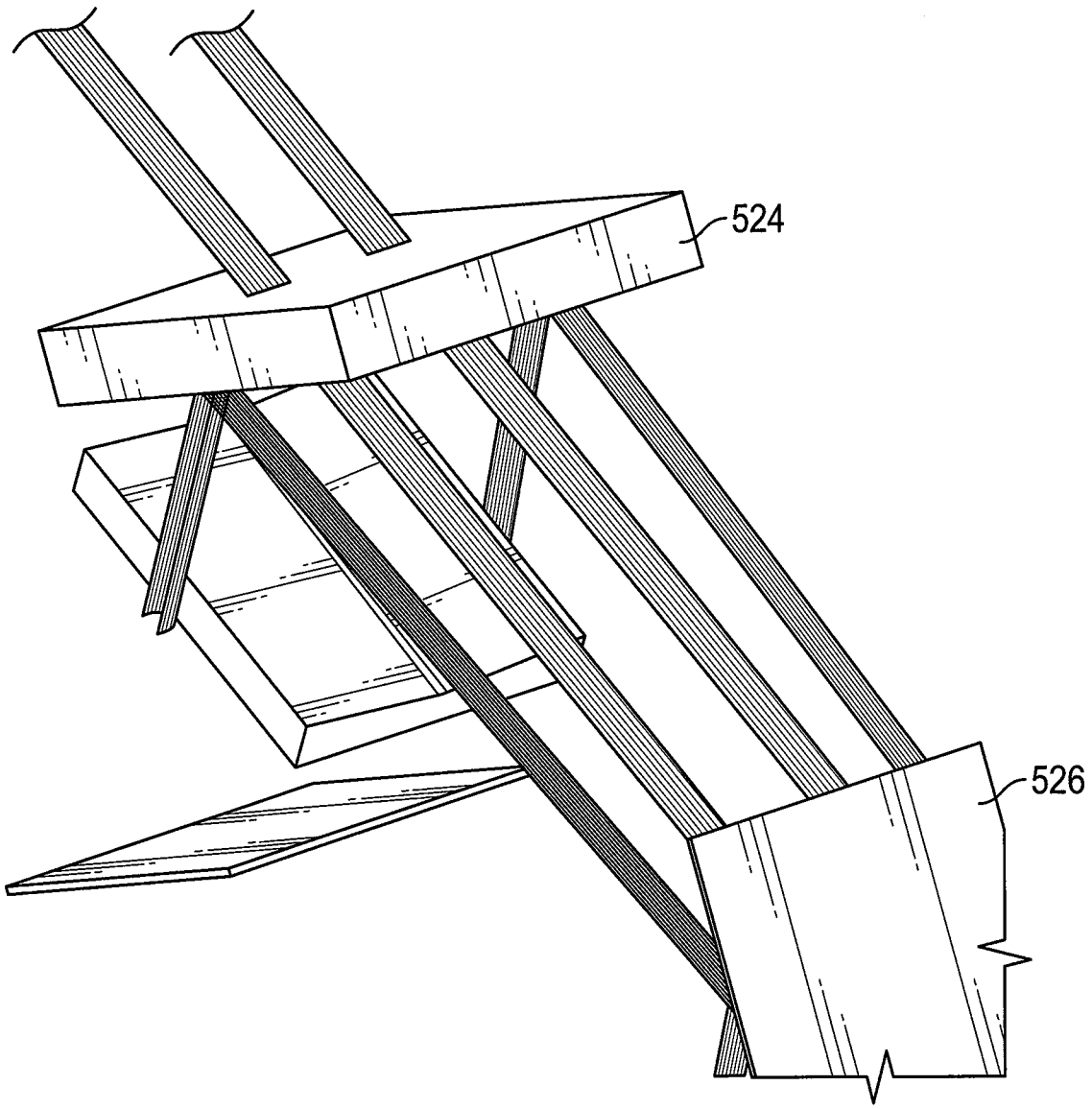


FIG. 13

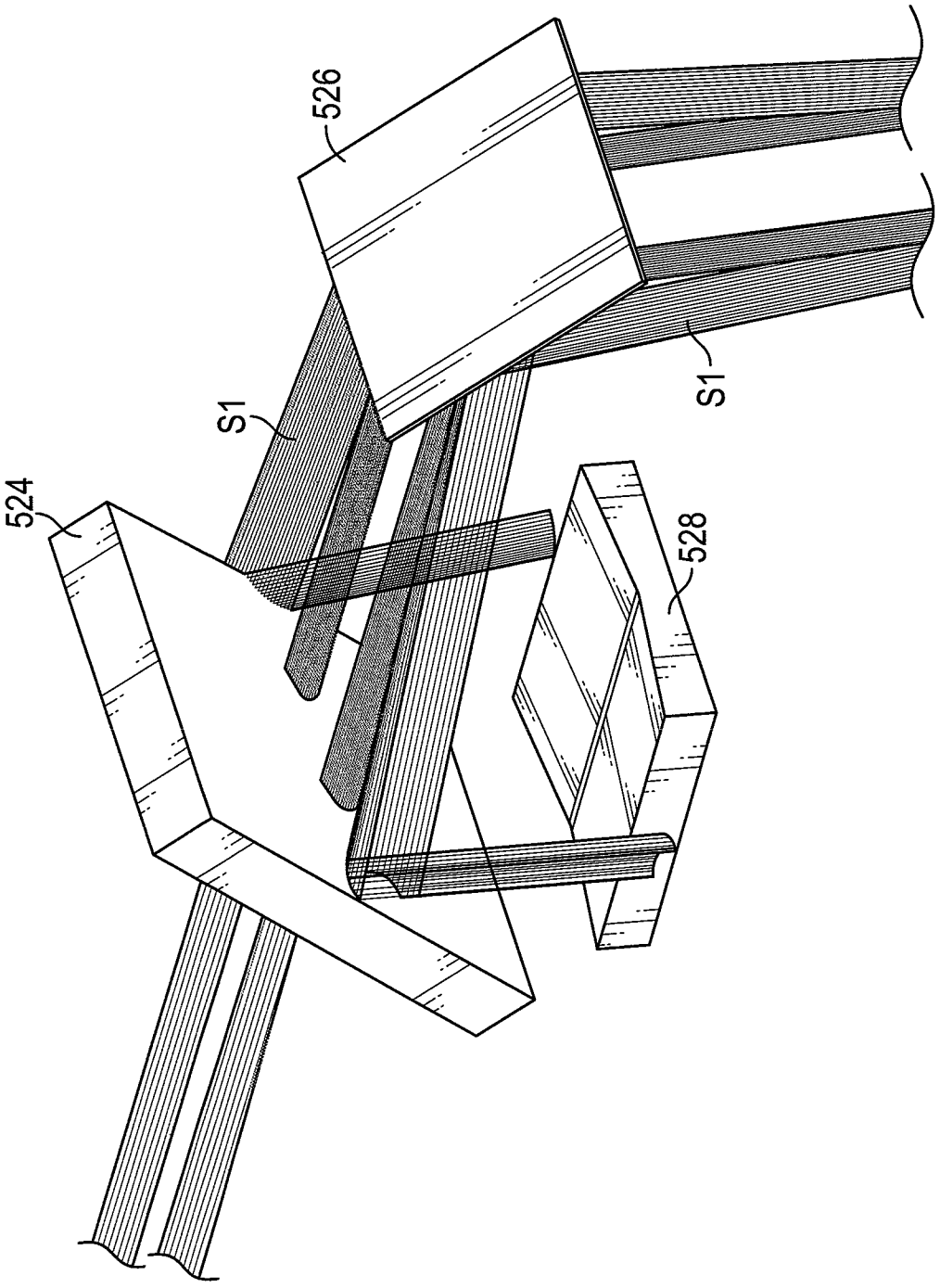


FIG. 14

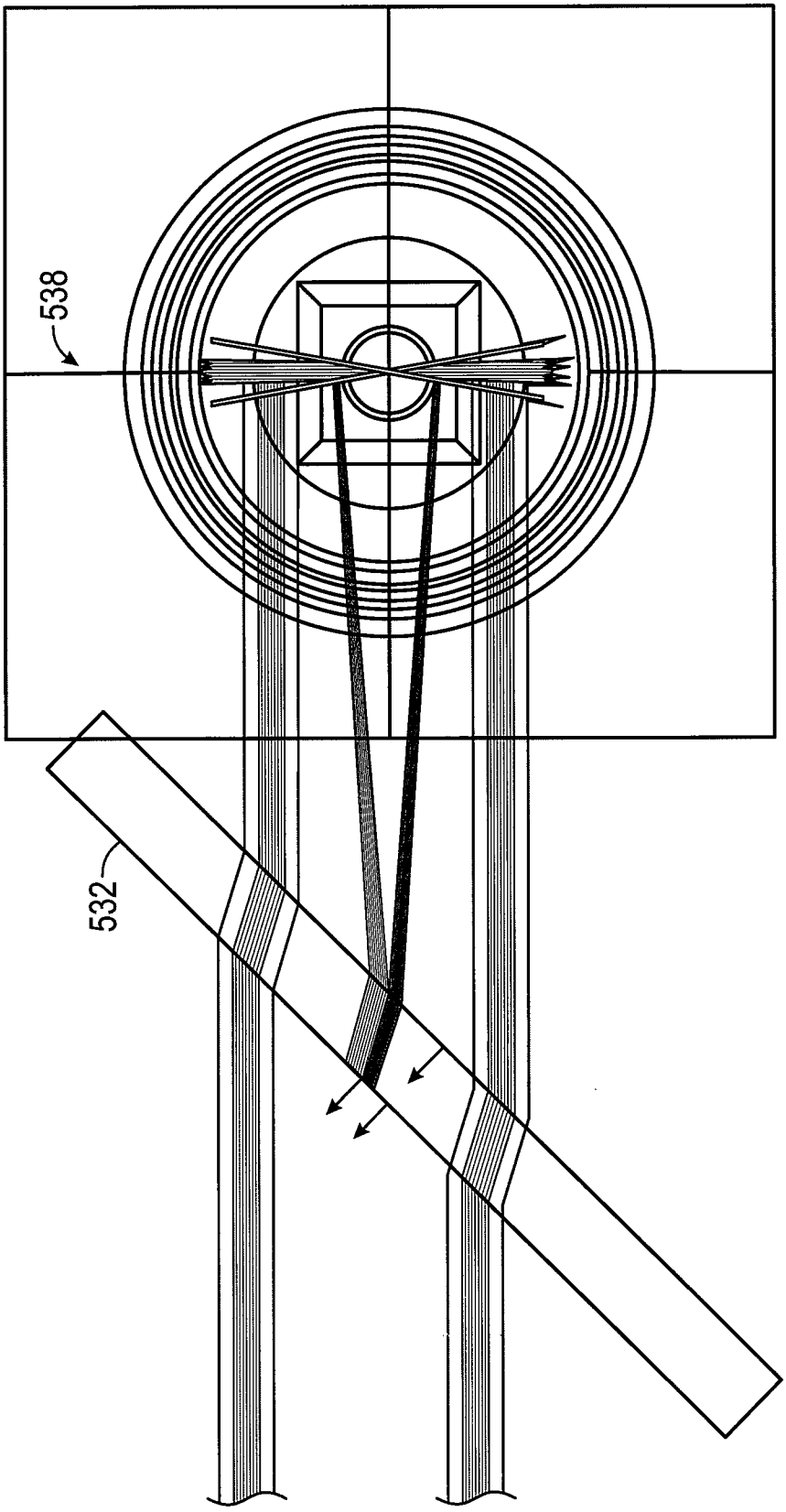


FIG. 15A

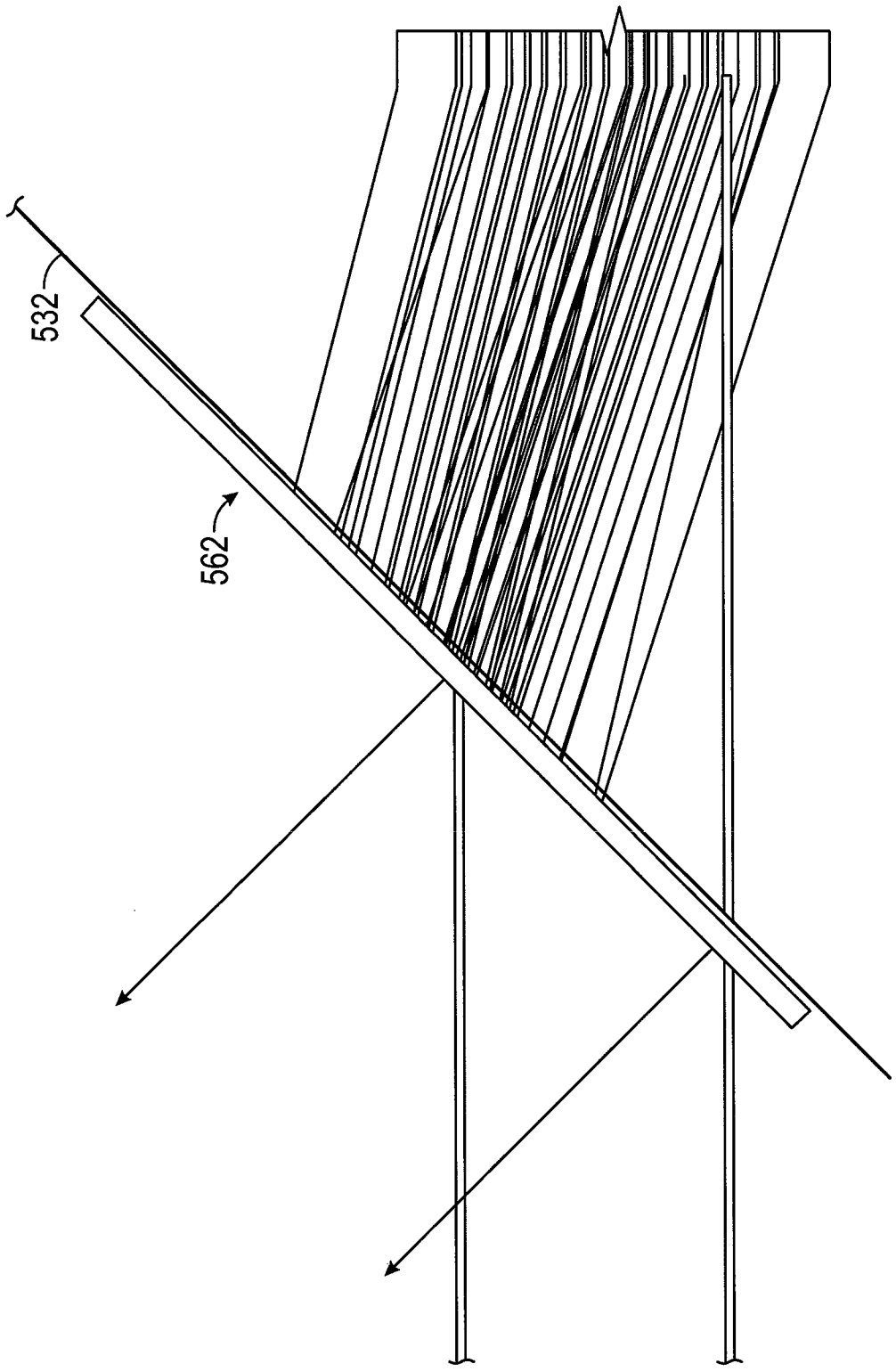


FIG. 15B

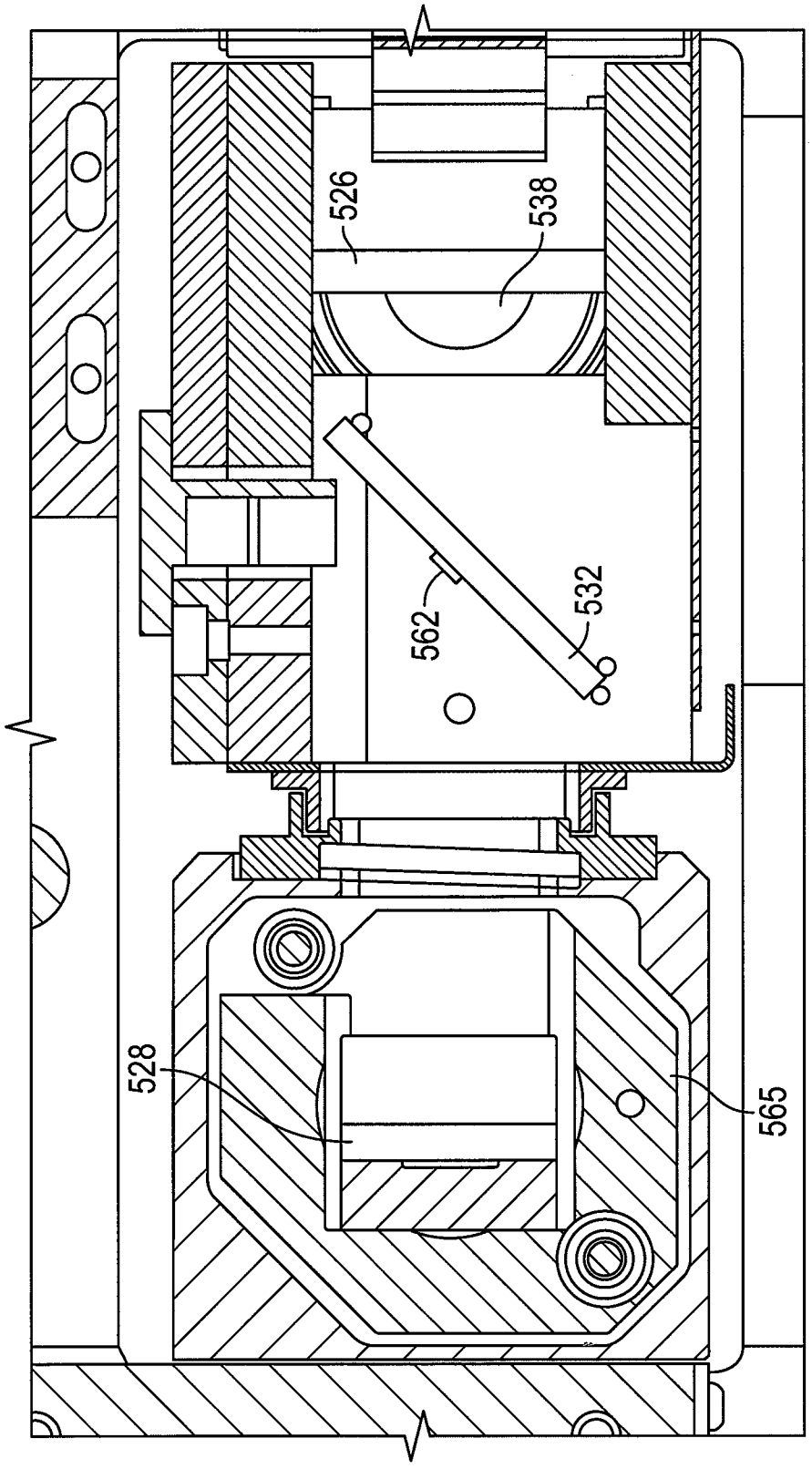


FIG. 15C

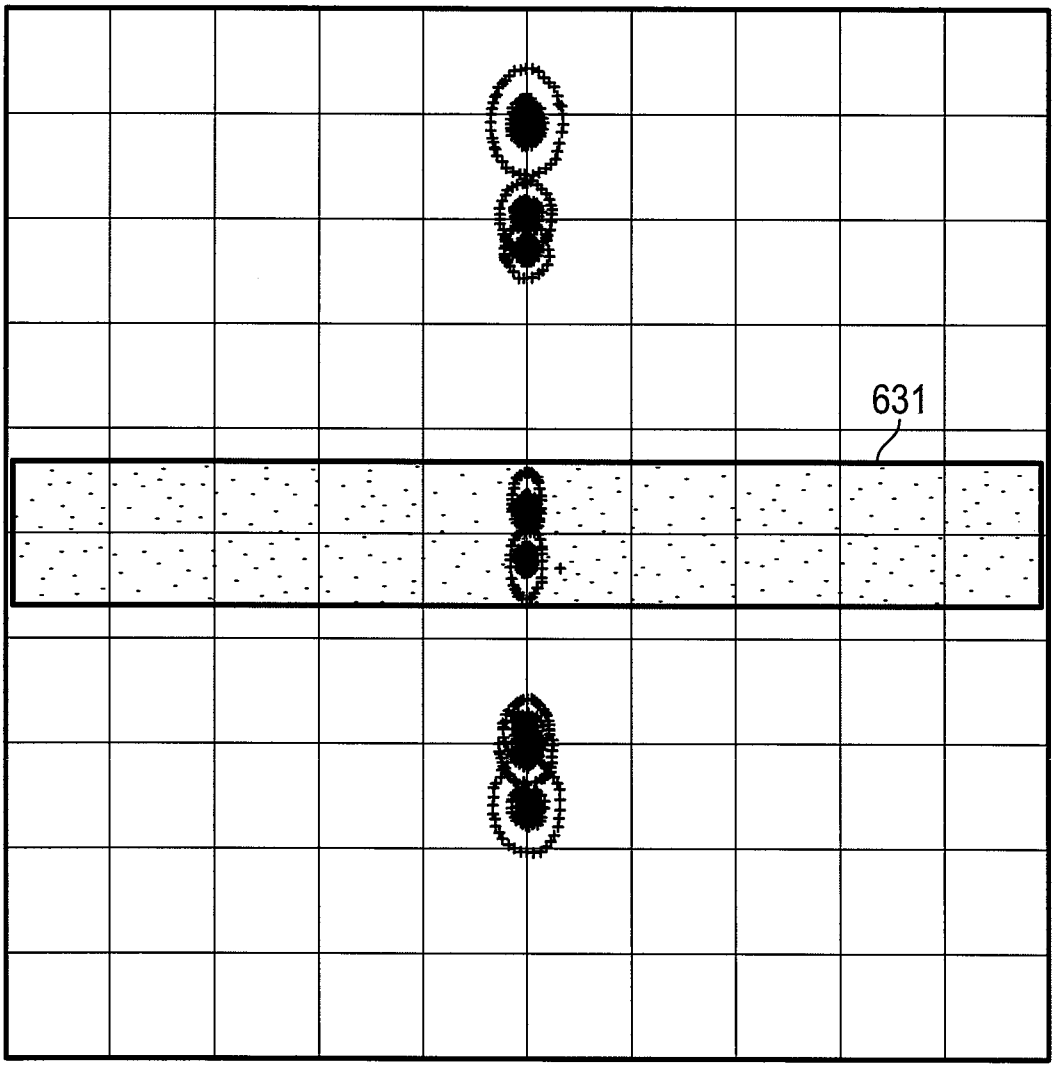
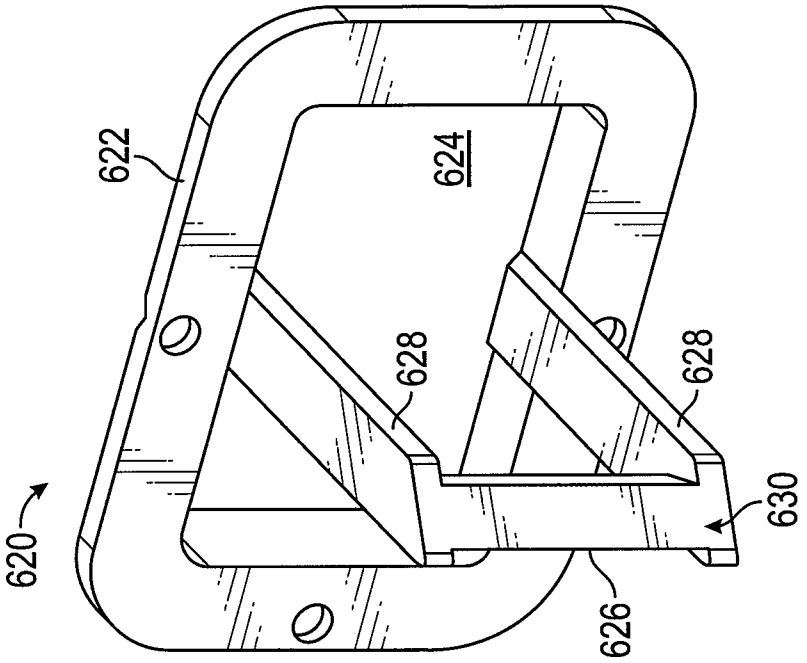


FIG. 15D



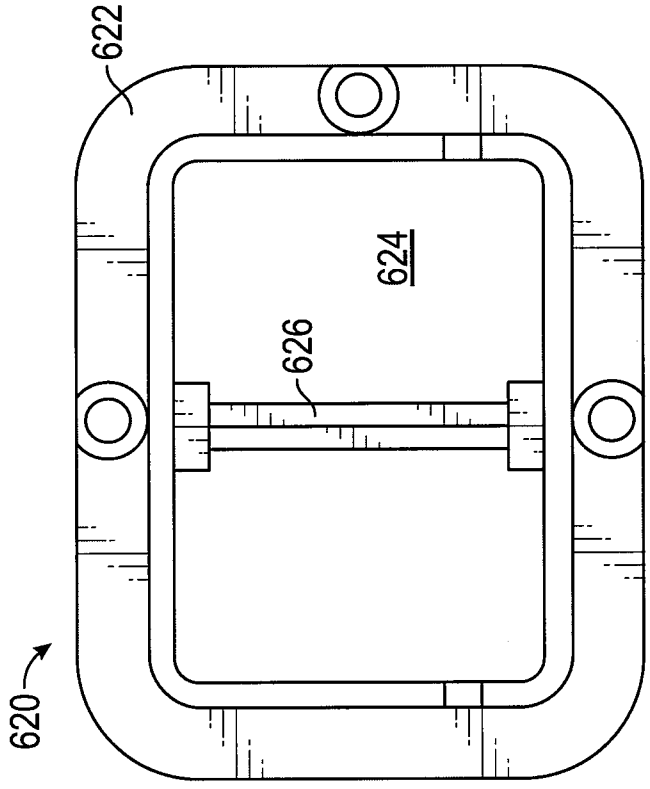


FIG. 16A

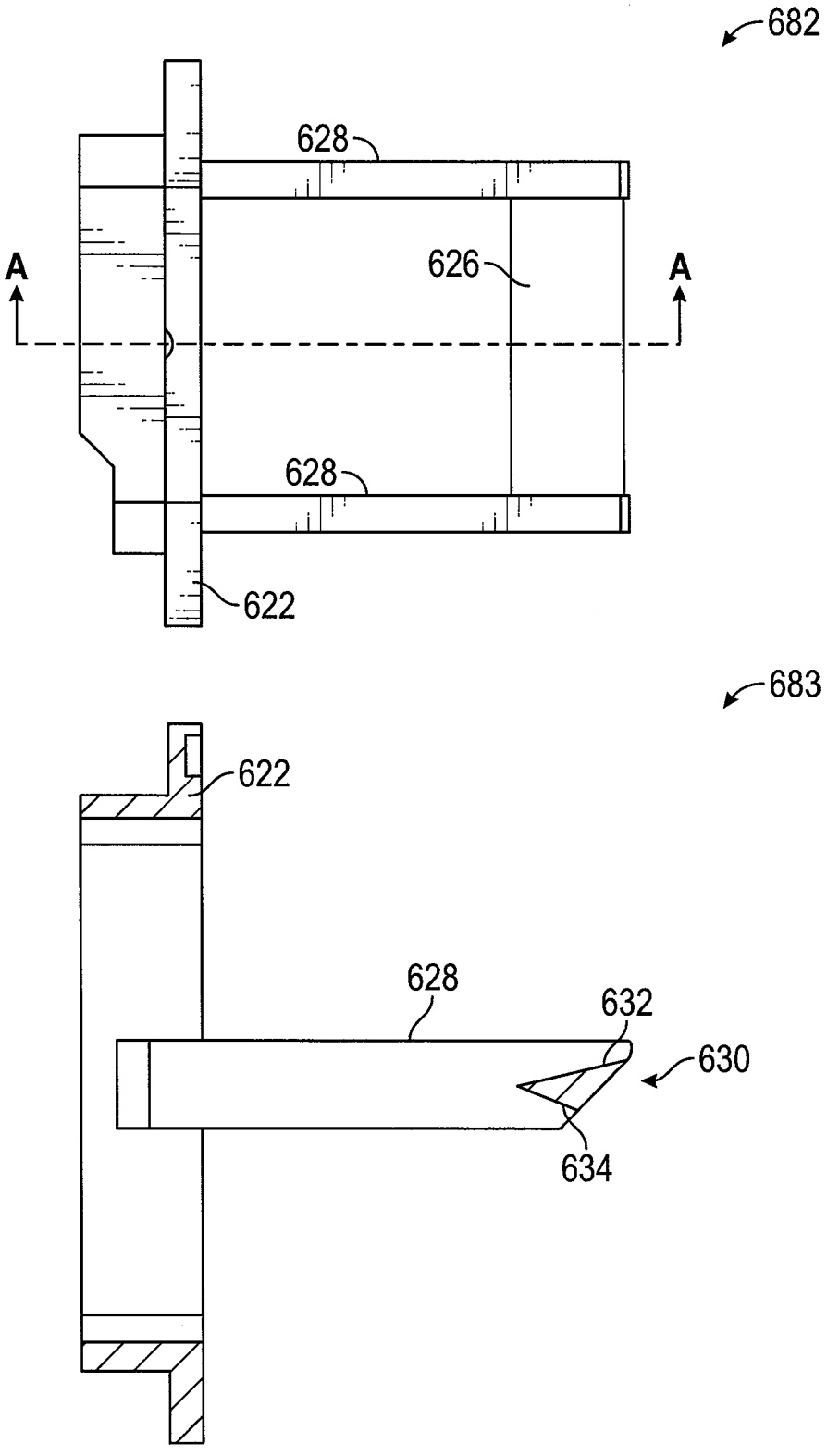


FIG. 16B

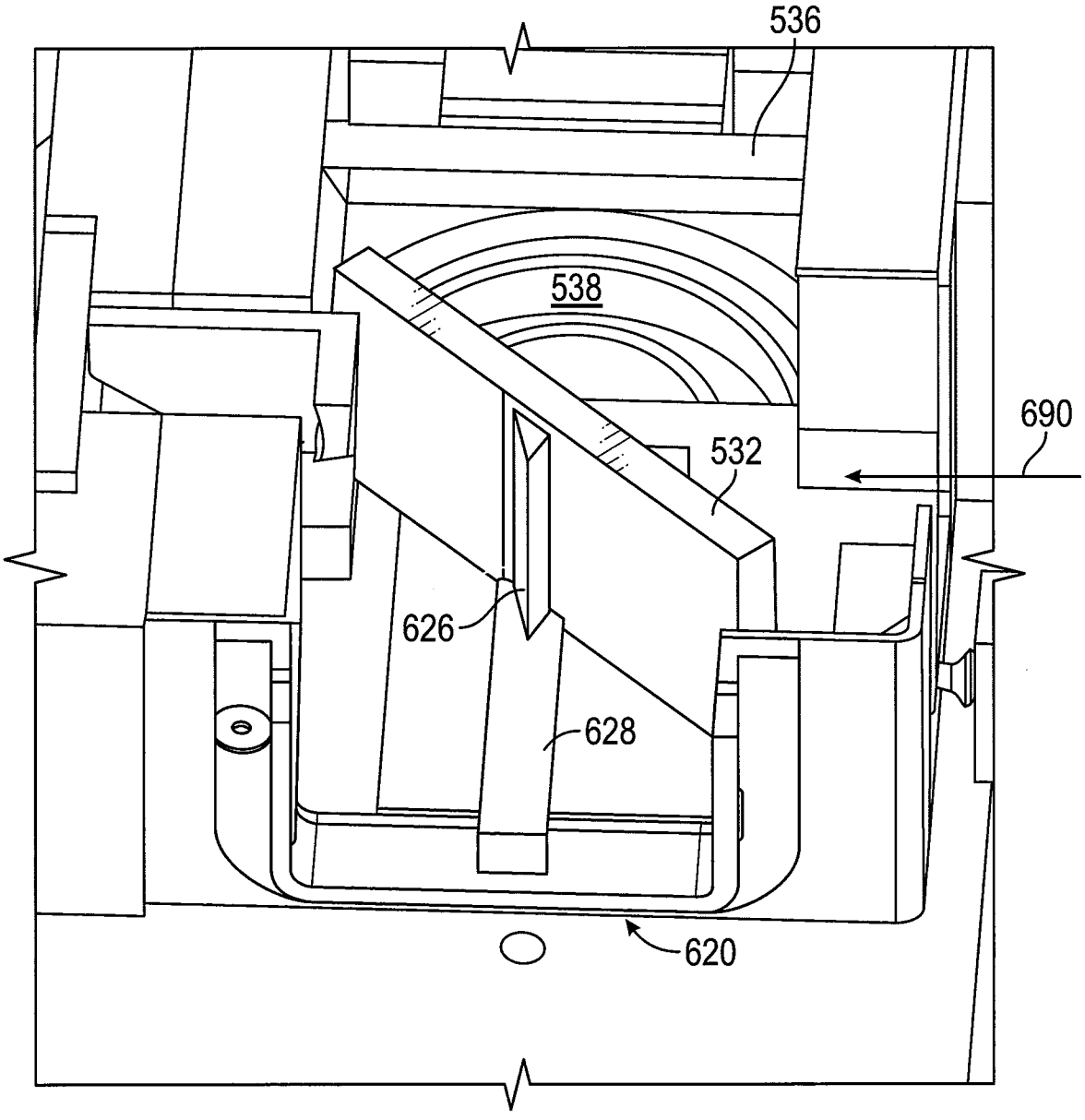


FIG. 17A

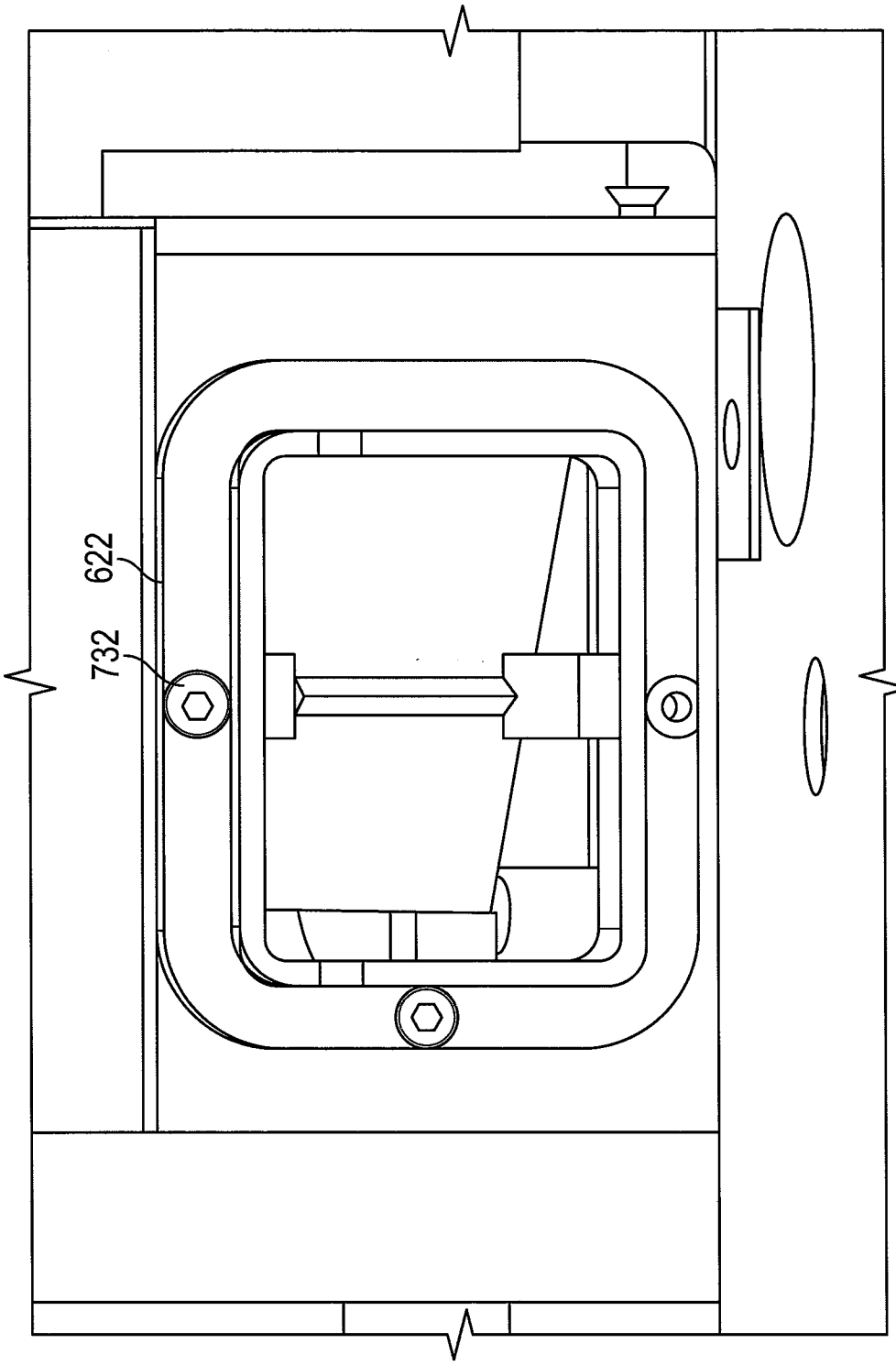
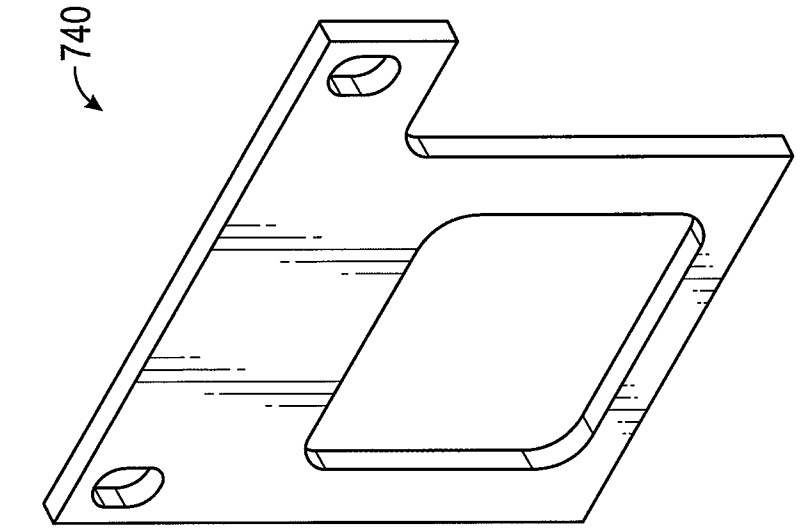


FIG. 17B



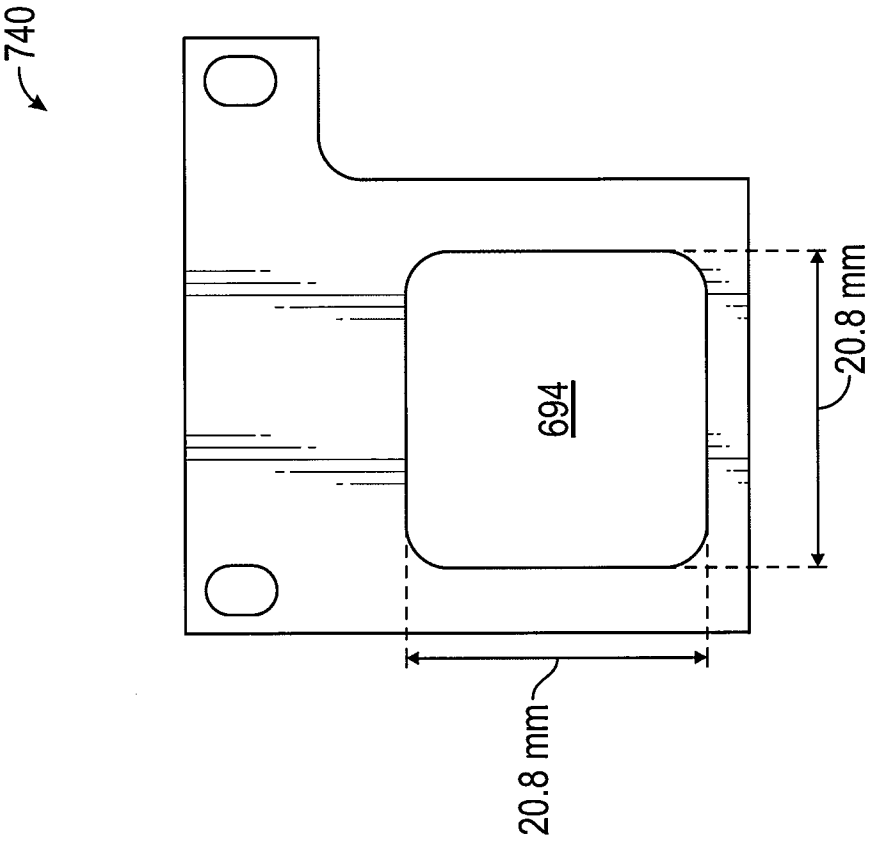


FIG. 18A

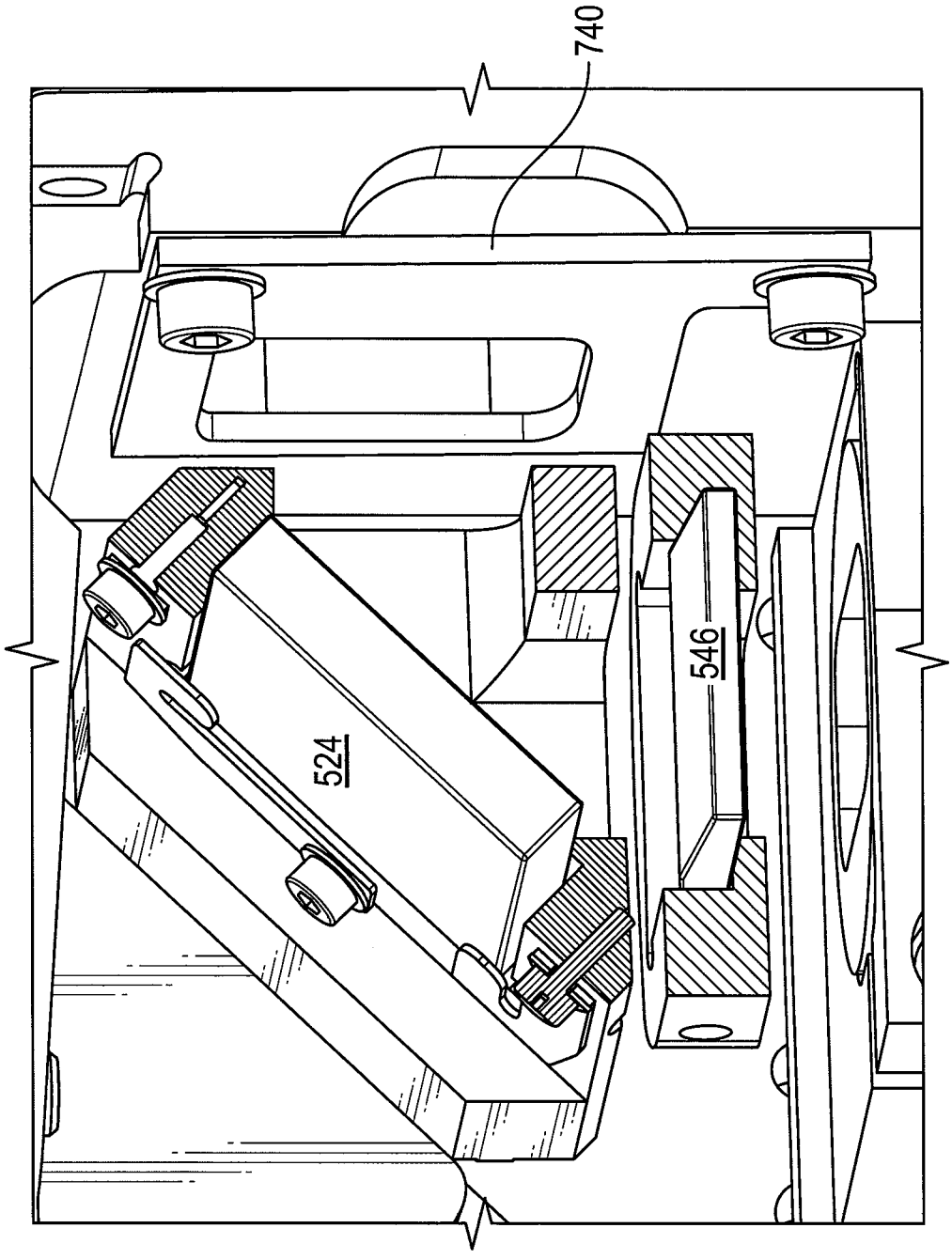


FIG. 18B

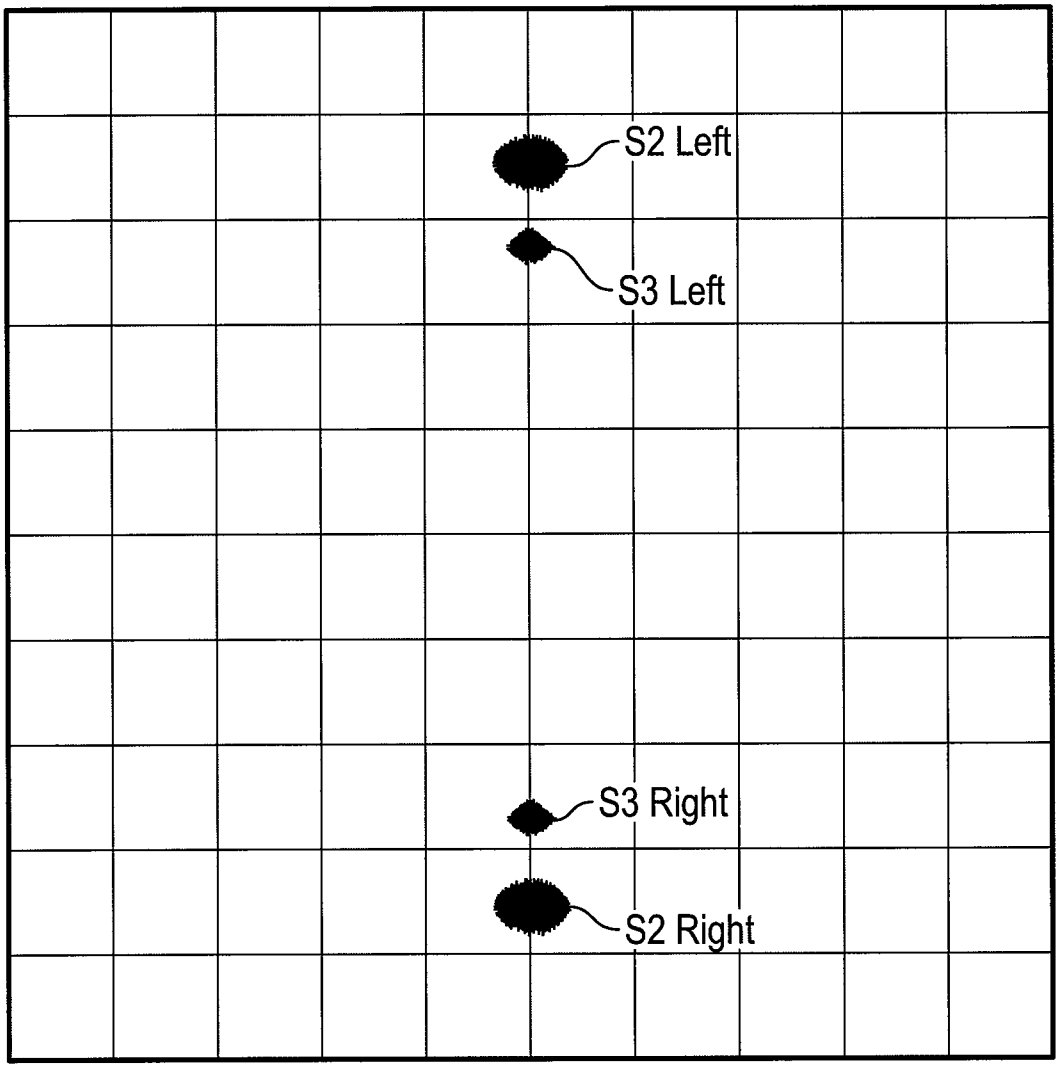


FIG. 19

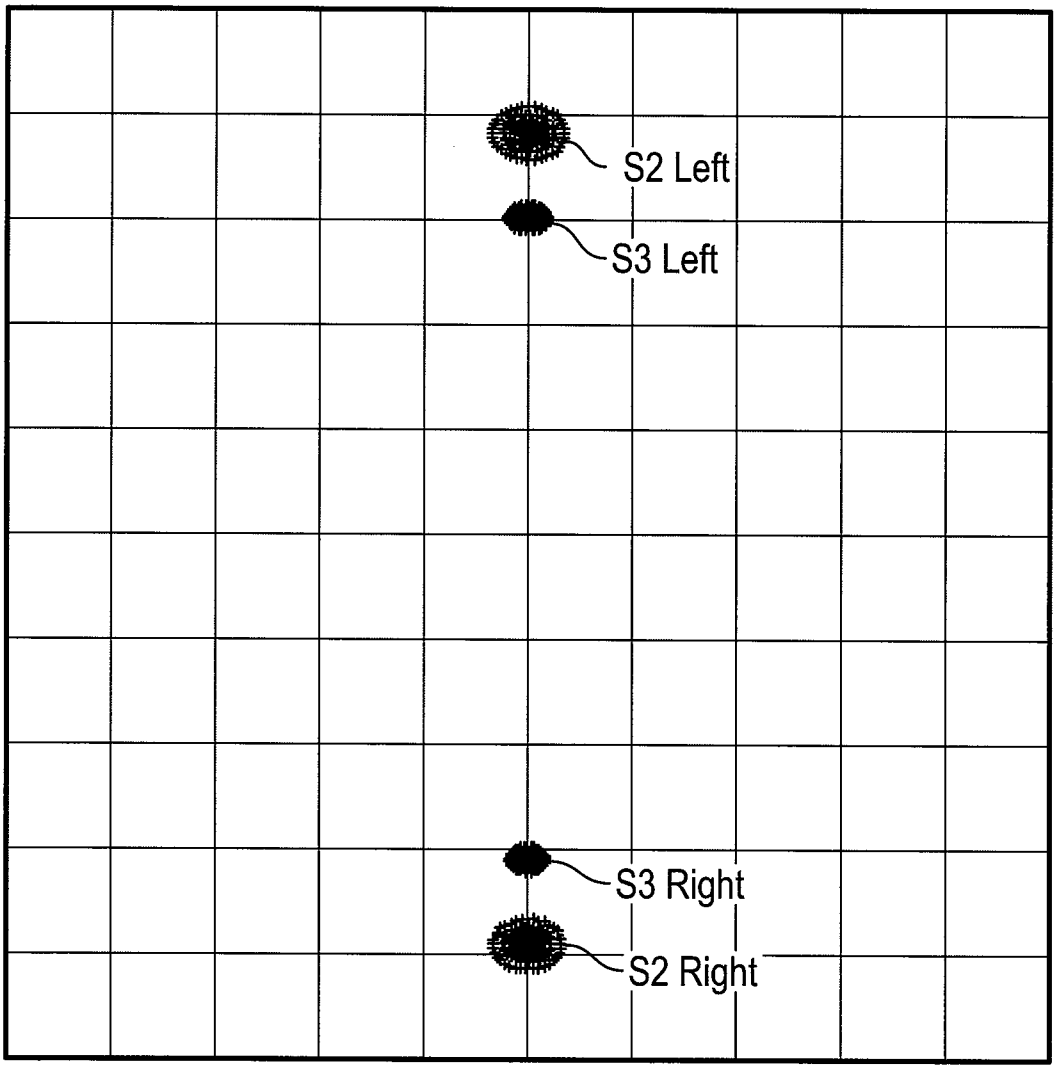


FIG. 20

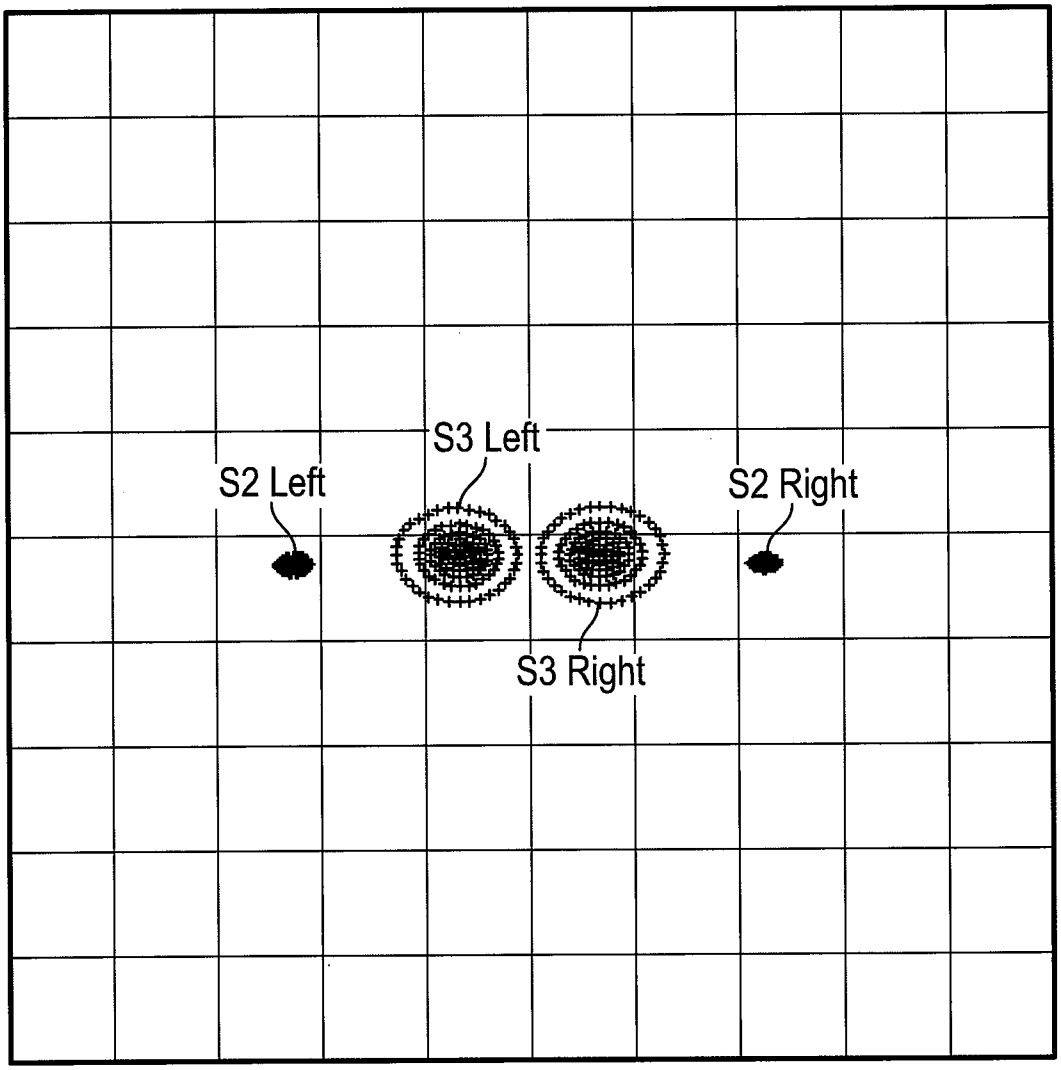


FIG. 21

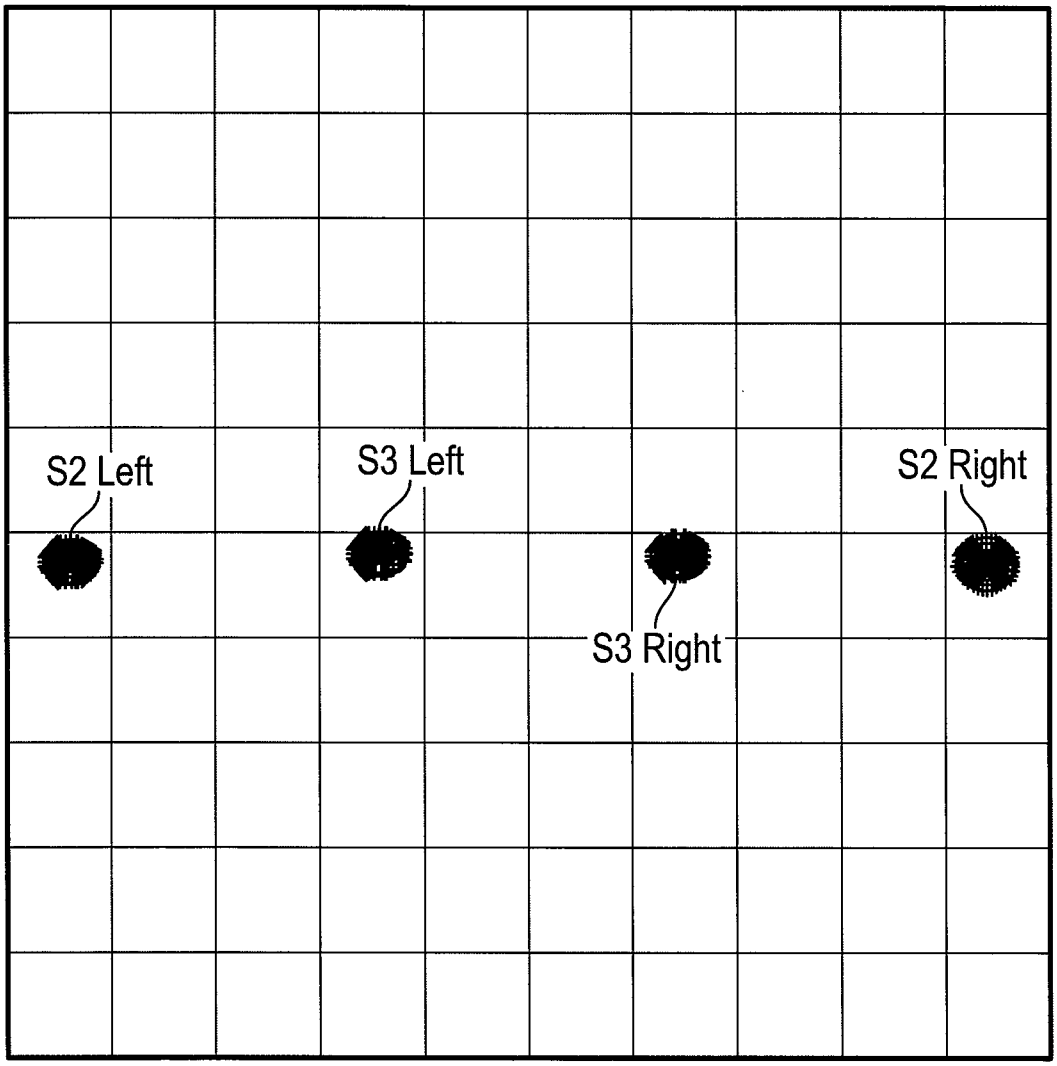


FIG. 22

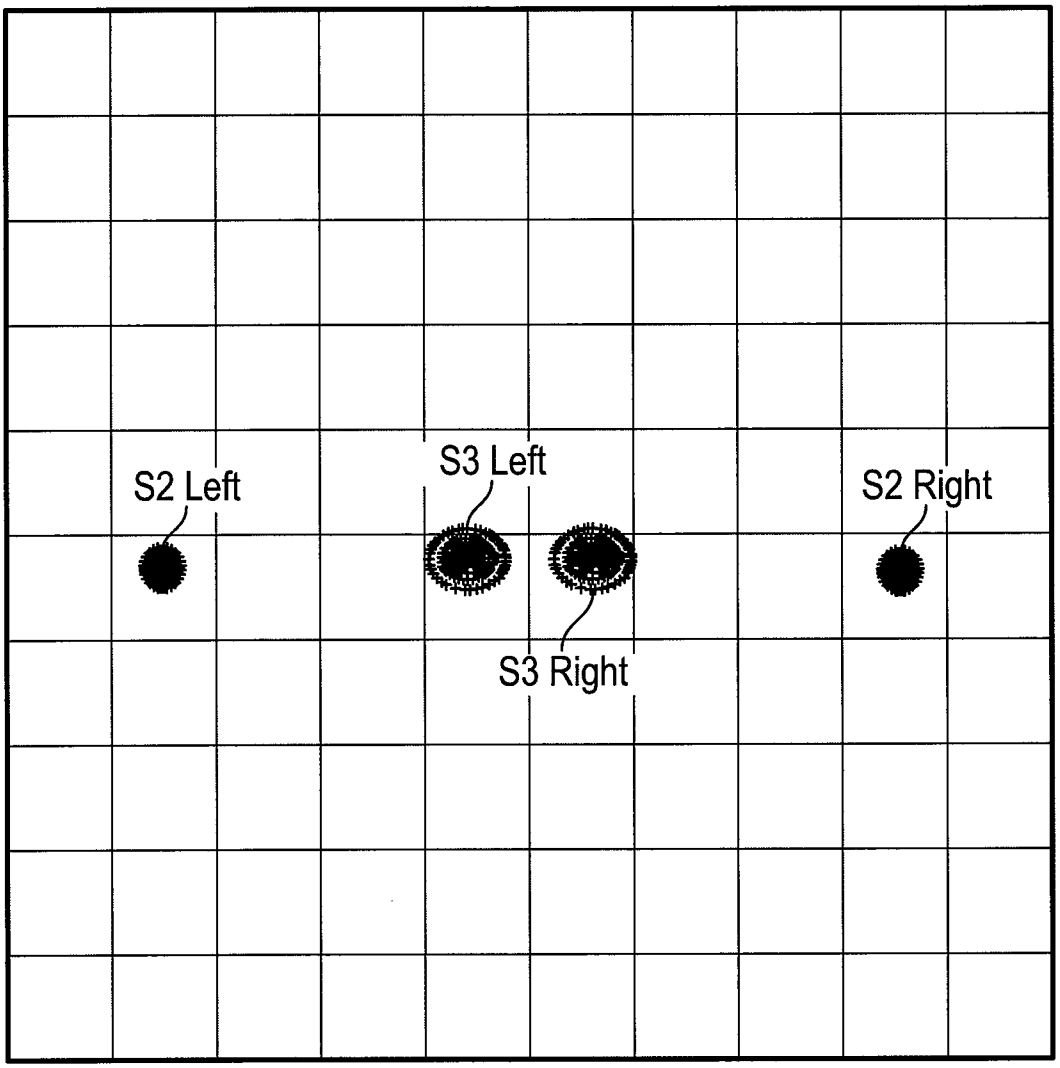


FIG. 23

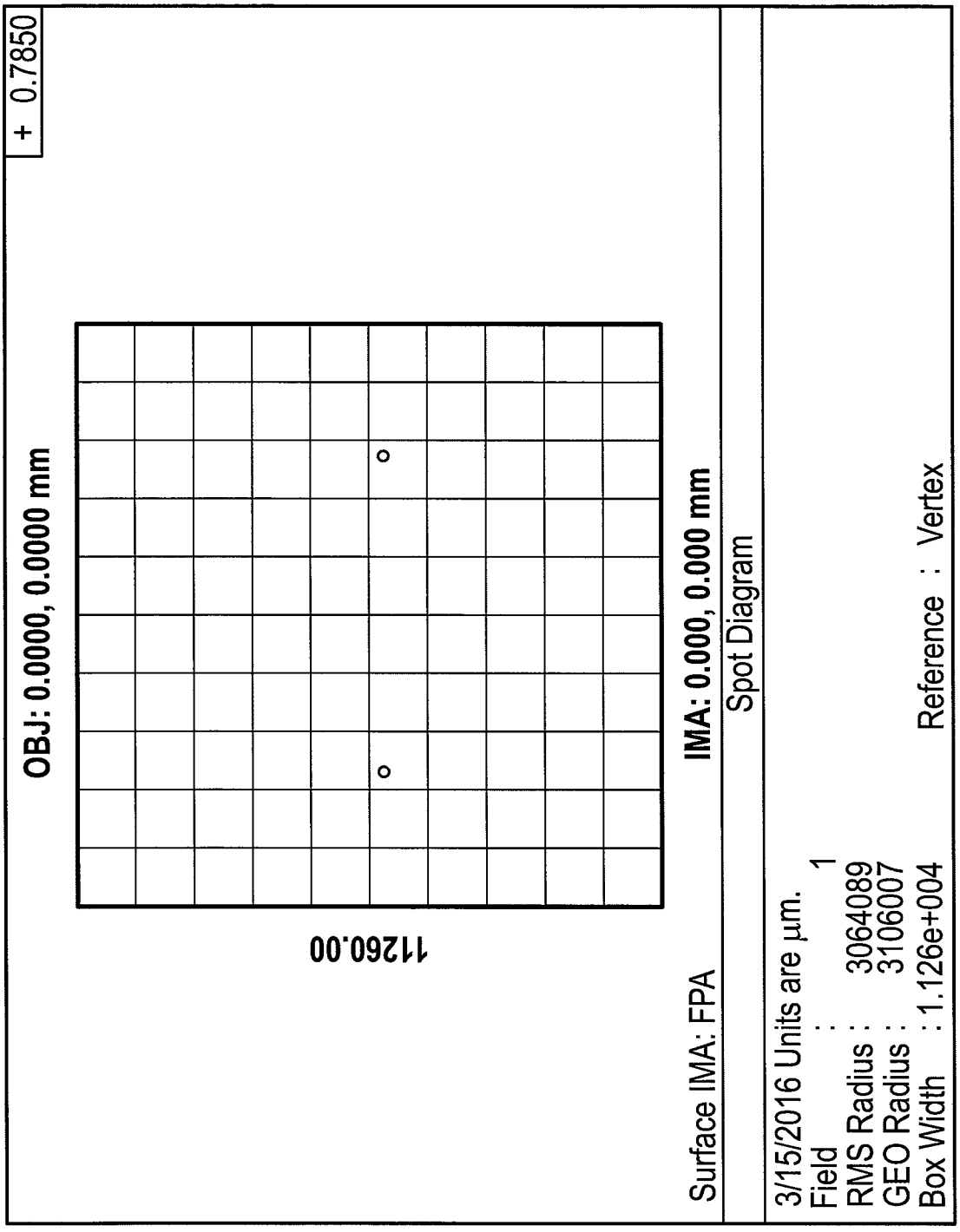

+ 0.7850
OBJ: 0.0000, 0.0000 mm
11260.00
Surface IMA: FPA
IMA: 0.000, 0.000 mm
Spot Diagram
3/15/2016 Units are µm.
Field : 1
RMS Radius : 3064089
GEO Radius : 3106007
Box Width : 1.126e+004
Reference : Vertex

FIG. 24

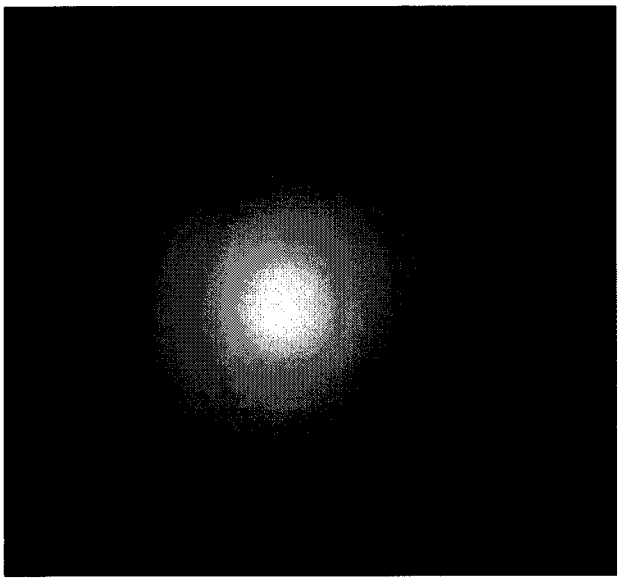


FIG. 25B

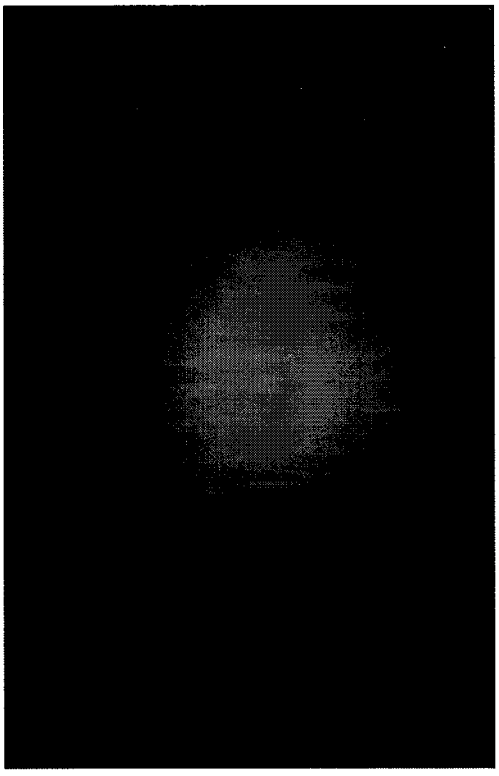


FIG. 25A

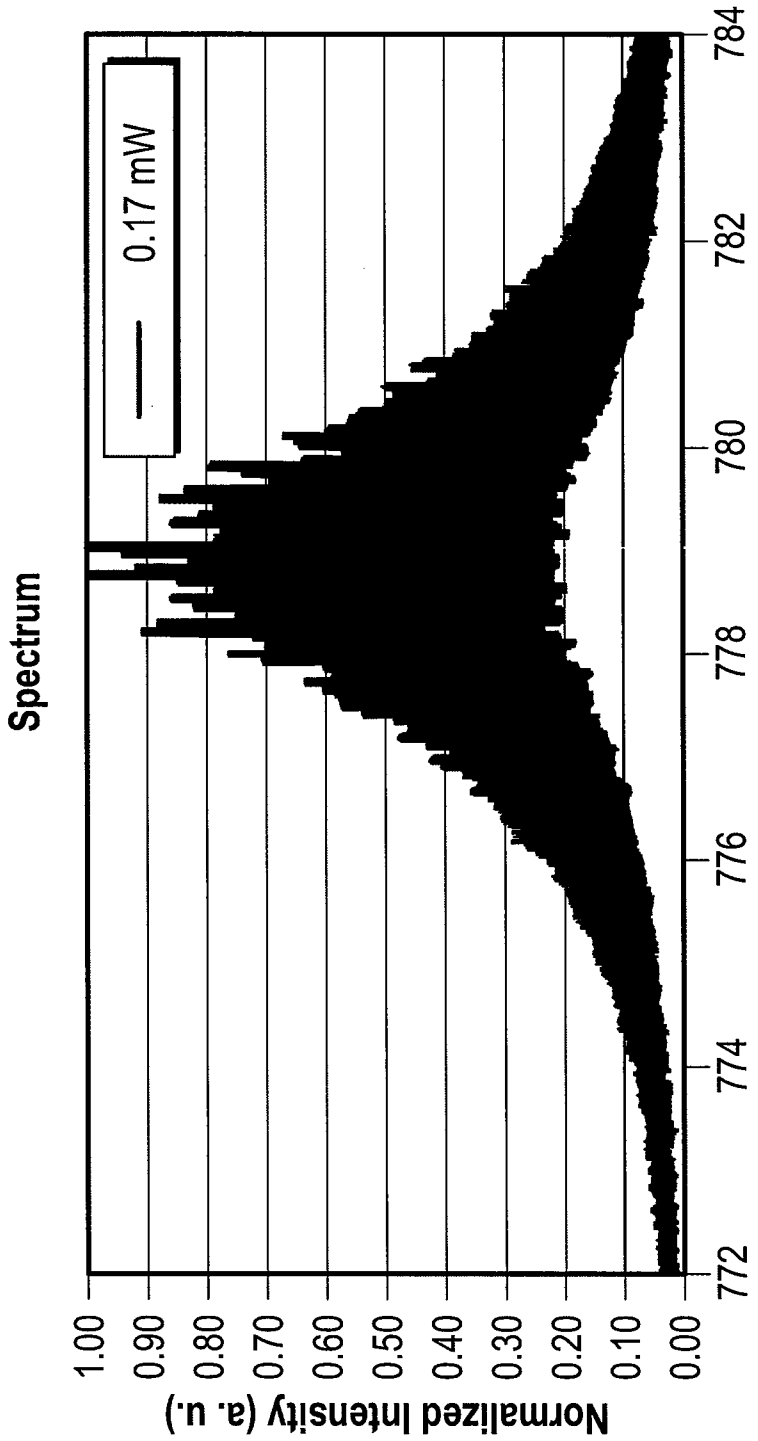
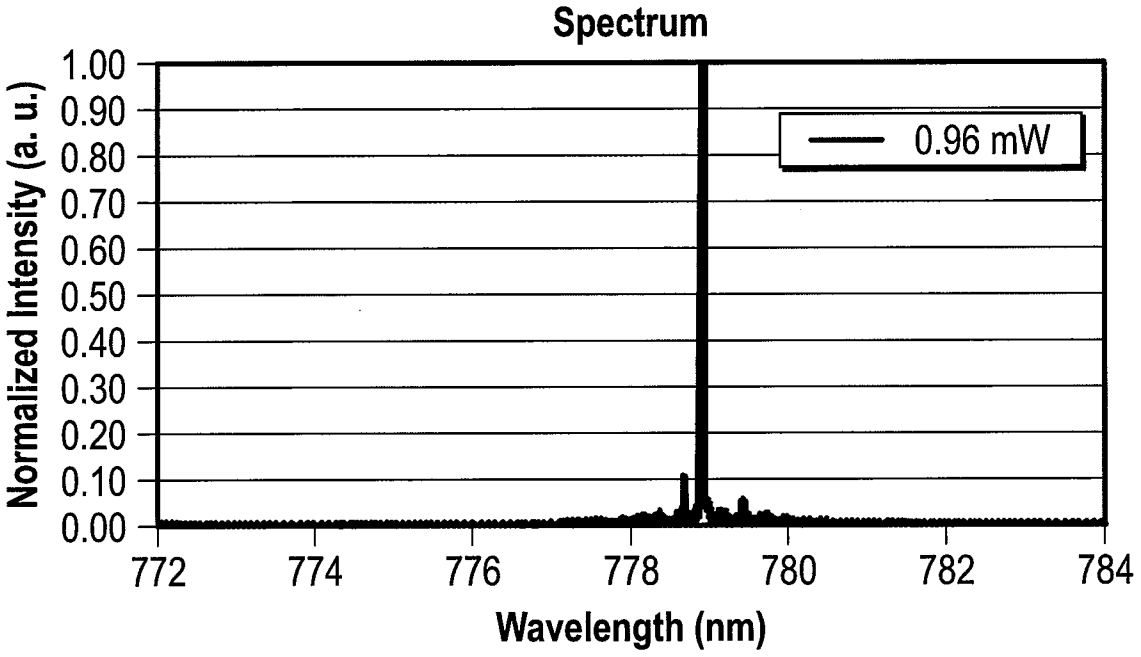

Spectrum
0.17 mW
Normalized Intensity (a. u.)
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
772
774
776
778
780
782
784
Wavelength (nm)

FIG. 26


Spectrum
Normalized Intensity (a. u.)
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
0.96 mW
772
774
776
778
780
782
784
Wavelength (nm)

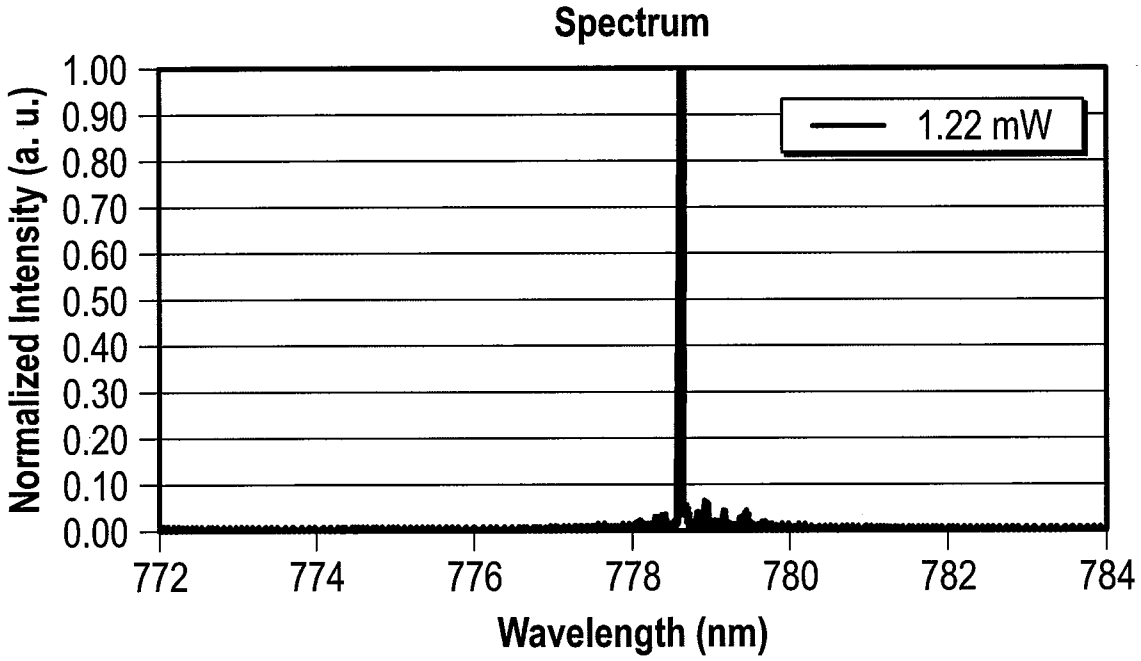

Spectrum
Normalized Intensity (a. u.)
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0.00
1.22 mW
772
774
776
778
780
782
784
Wavelength (nm)

FIG. 27

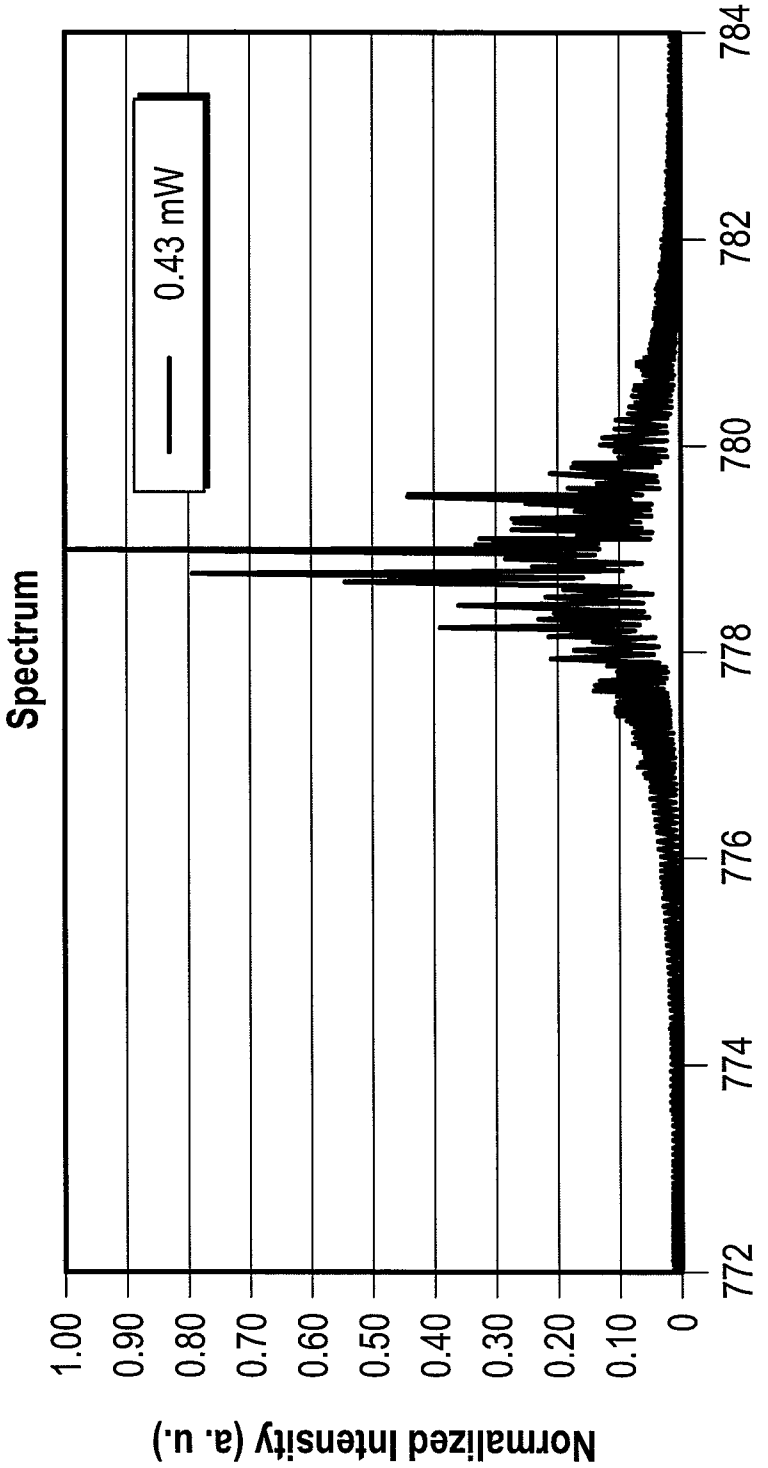

Spectrum
0.43 mW
Normalized Intensity (a. u.)
1.00
0.90
0.80
0.70
0.60
0.50
0.40
0.30
0.20
0.10
0
772
774
776
778
780
782
784
Wavelength (nm)

FIG. 28

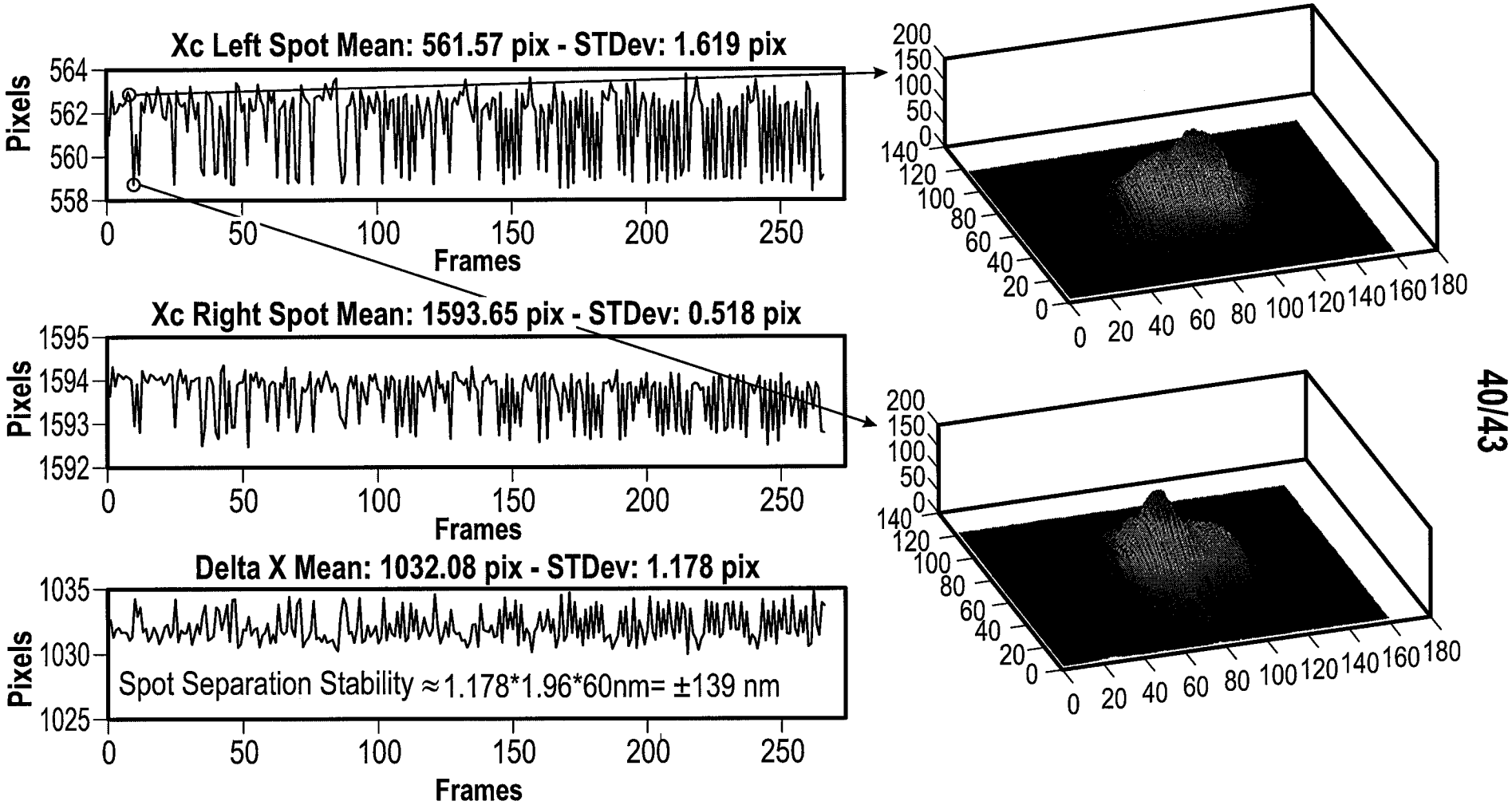

Xc Left Spot Mean: 561.57 pix - STDev: 1.619 pix
Pixels
564
562
560
558
0
50
100
150
200
250
Frames
Xc Right Spot Mean: 1593.65 pix - STDev: 0.518 pix
Pixels
1595
1594
1593
1592
0
50
100
150
200
250
Frames
Delta X Mean: 1032.08 pix - STDev: 1.178 pix
Pixels
1035
1030
1025
Spot Separation Stability ≈1.178*1.96*60nm= ±139 nm
0
50
100
150
200
250
Frames
200
150
100
50
0
140
120
100
80
60
40
20
0
0 20 40 60 80 100 120 140 160 180
200
150
100
50
0
140
120
100
80
60
40
20
0
0 20 40 60 80 100 120 140 160 180

FIG. 29

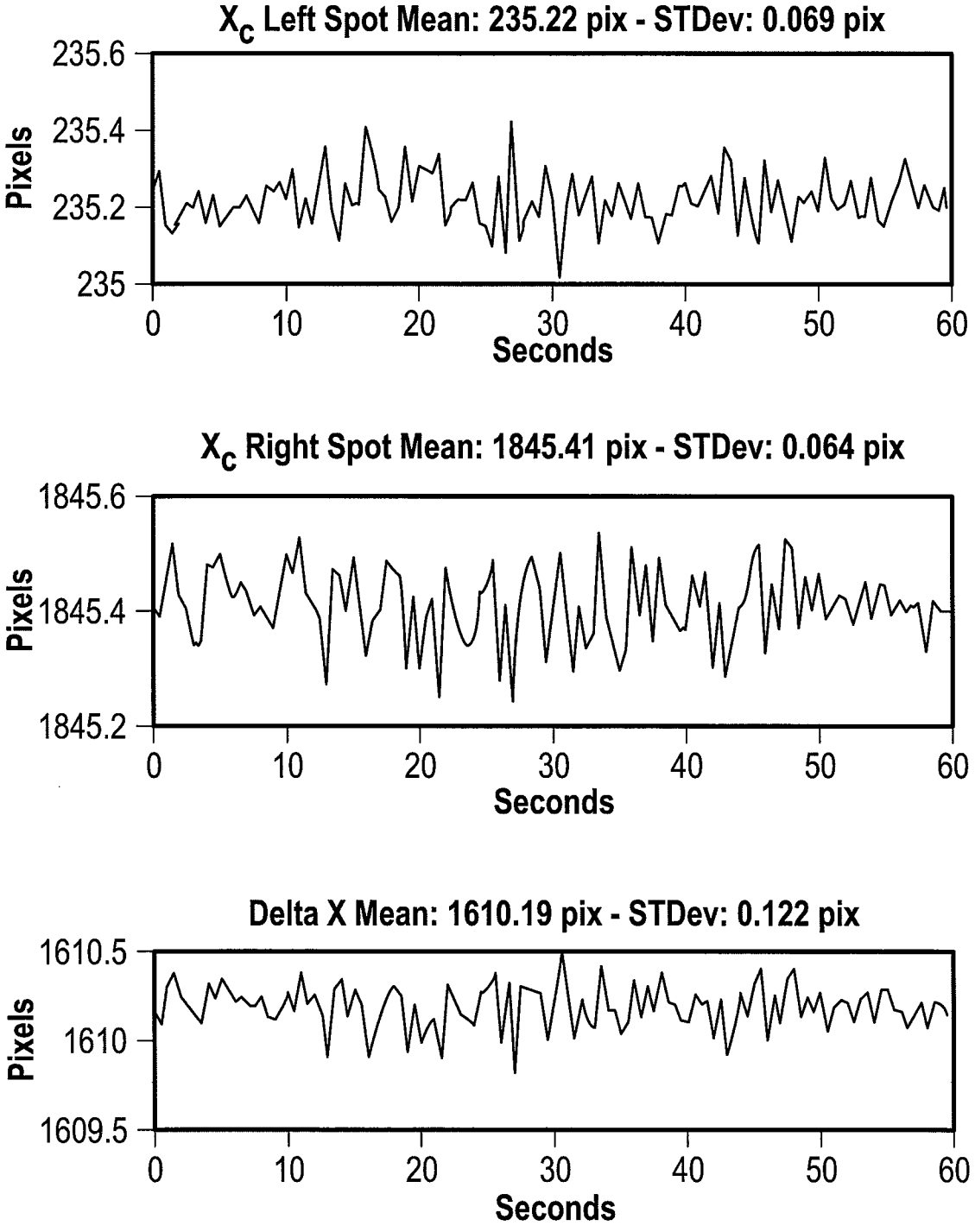

X_c Left Spot Mean: 235.22 pix - STDev: 0.069 pix
Pixels
235.6
235.4
235.2
235
0
10
20
30
40
50
60
Seconds
X_c Right Spot Mean: 1845.41 pix - STDev: 0.064 pix
Pixels
1845.6
1845.4
1845.2
0
10
20
30
40
50
60
Seconds
Delta X Mean: 1610.19 pix - STDev: 0.122 pix
Pixels
1610.5
1610
1609.5
0
10
20
30
40
50
60
Seconds

FIG. 30A

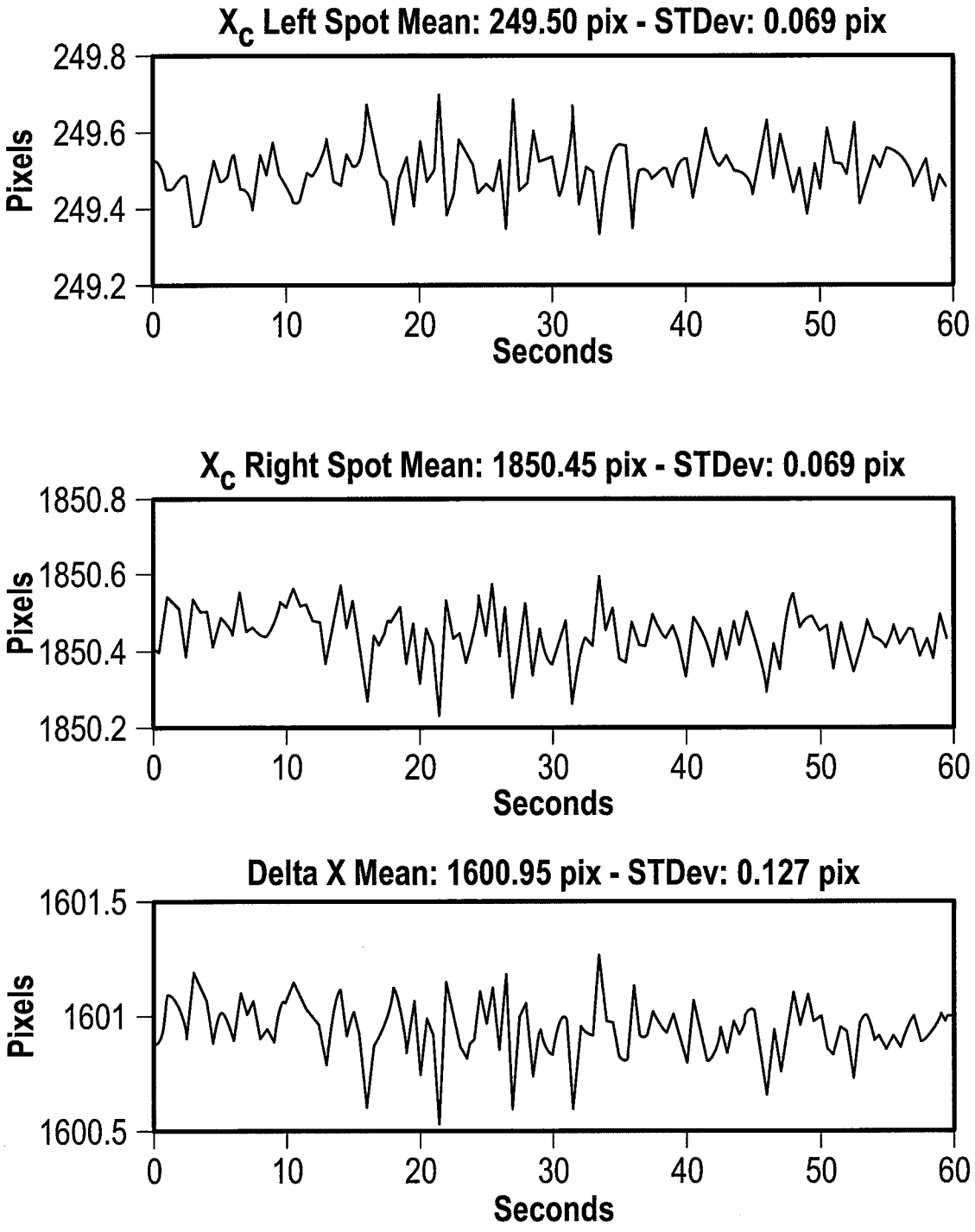

X_C Left Spot Mean: 249.50 pix - STDev: 0.069 pix
Pixels
249.8
249.6
249.4
249.2
0
10
20
30
40
50
60
Seconds
X_C Right Spot Mean: 1850.45 pix - STDev: 0.069 pix
Pixels
1850.8
1850.6
1850.4
1850.2
0
10
20
30
40
50
60
Seconds
Delta X Mean: 1600.95 pix - STDev: 0.127 pix
Pixels
1601.5
1601
1600.5
0
10
20
30
40
50
60
Seconds

FIG. 30B

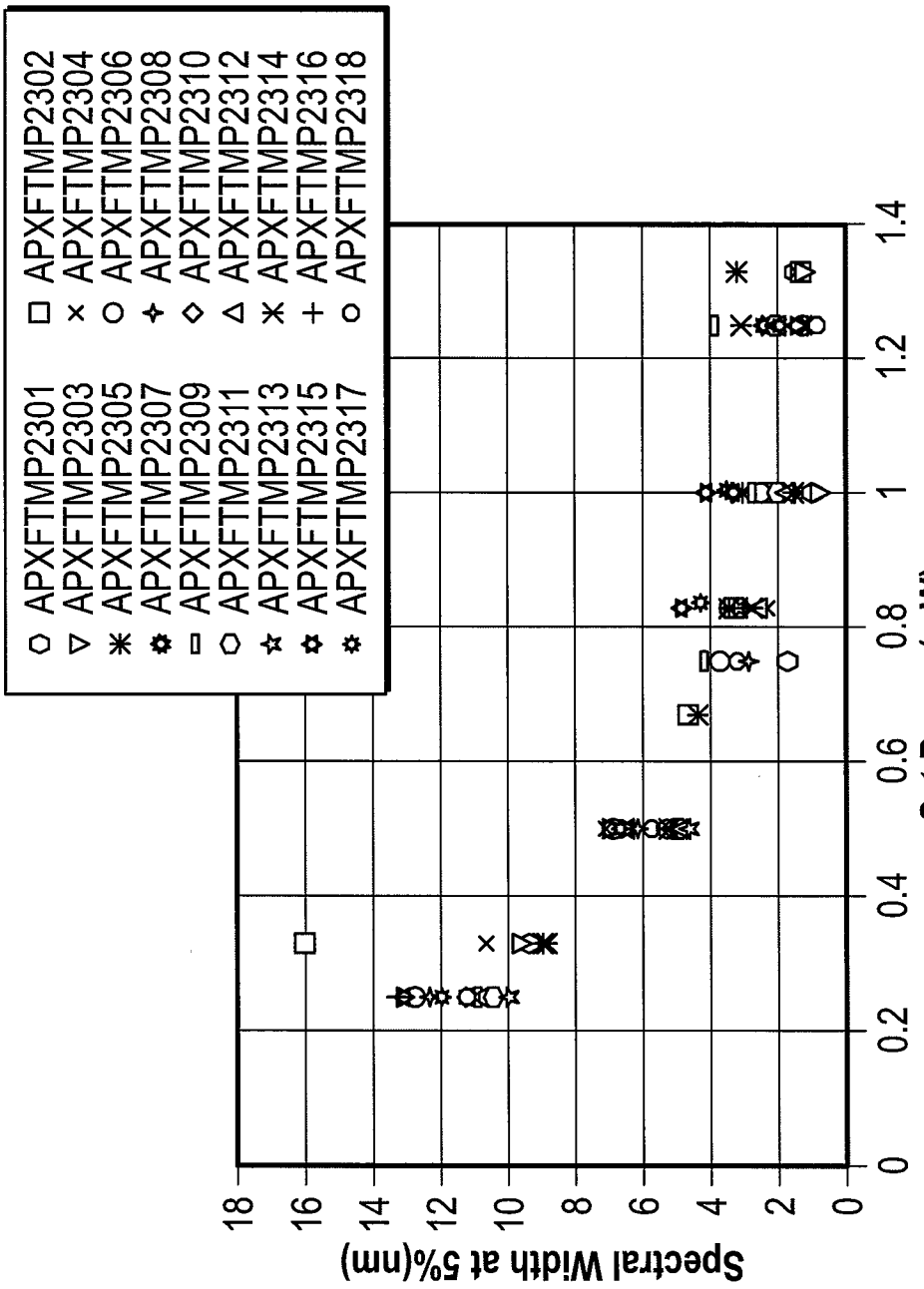

APXFTMP2301
APXFTMP2302
APXFTMP2303
APXFTMP2304
APXFTMP2305
APXFTMP2306
APXFTMP2307
APXFTMP2308
APXFTMP2309
APXFTMP2310
APXFTMP2311
APXFTMP2312
APXFTMP2313
APXFTMP2314
APXFTMP2315
APXFTMP2316
APXFTMP2317
APXFTMP2318
Spectral Width at 5%(nm)
0
2
4
6
8
10
12
14
16
18
0
0.2
0.4
0.6
0.8
1
1.2
1.4
Set Power (mW)

FIG. 31