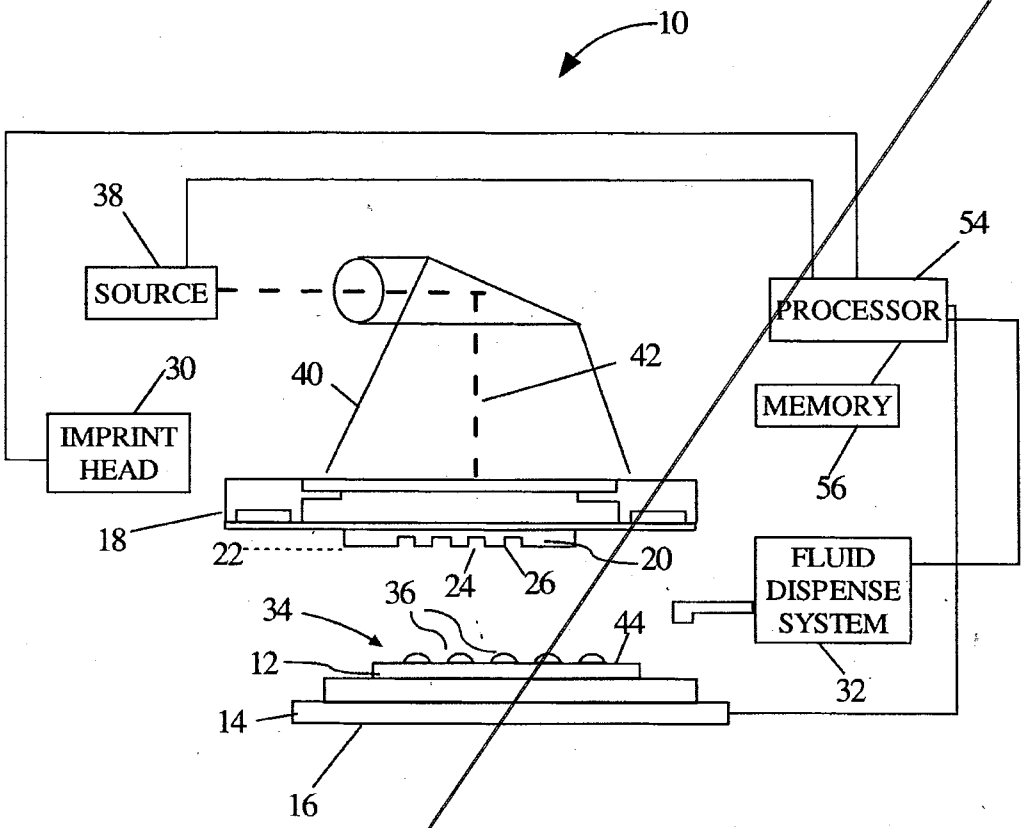

10
38
SOURCE
54
PROCESSOR
30
IMPRINT HEAD
40
42
MEMORY
56
18
22
20
24
26
36
34
44
FLUID DISPENSE SYSTEM
12
32
14
16

FIG. 1

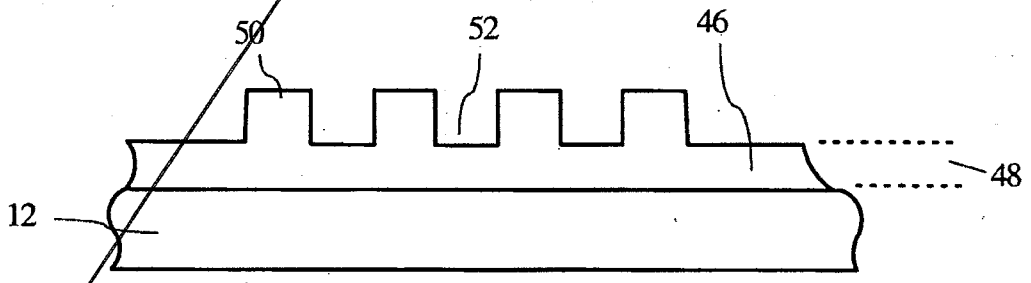

50
52
46
48
12

FIG. 2

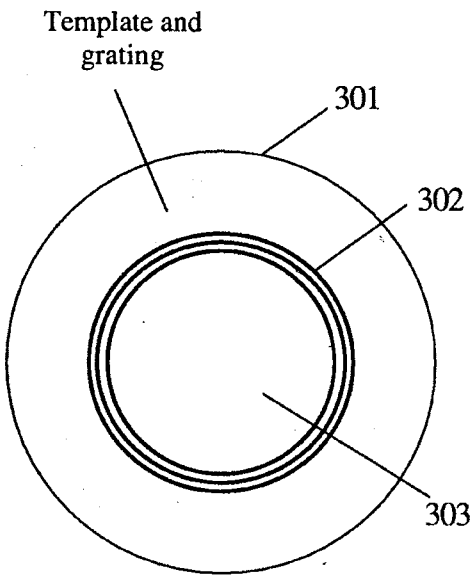


FIG. 3A

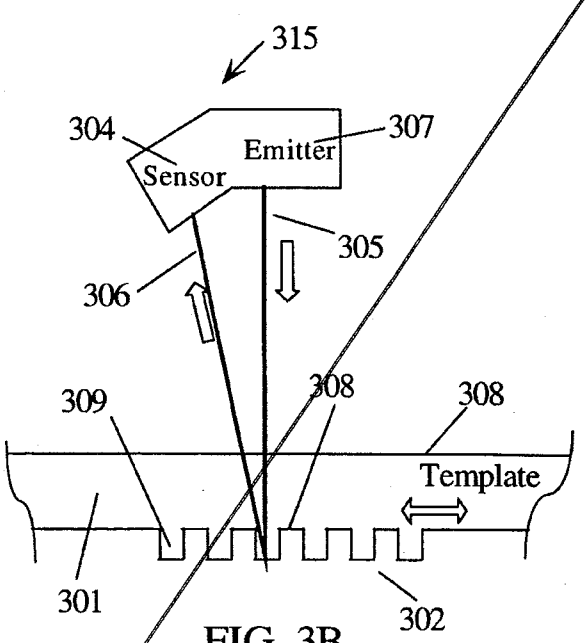


FIG. 3B

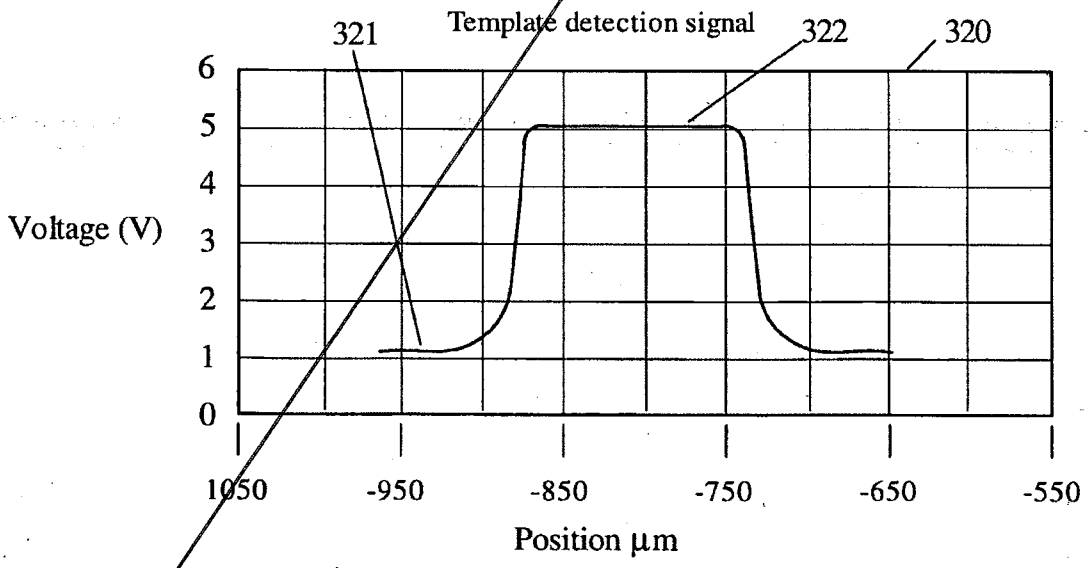


FIG. 3C

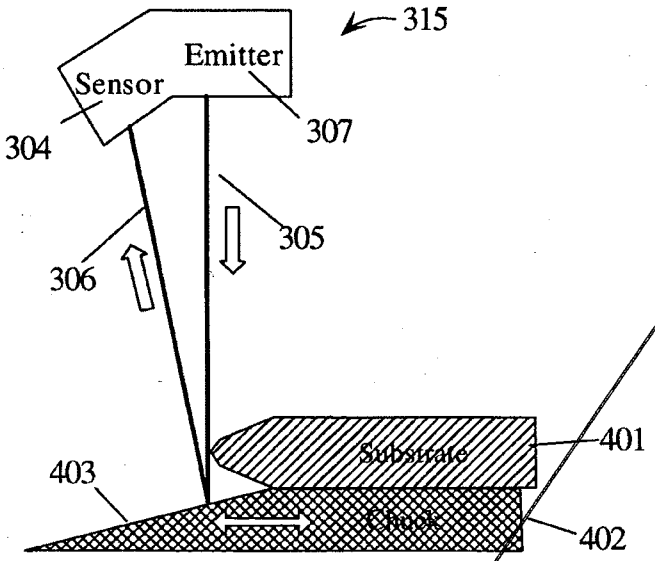

315
Emitter
Sensor
304
307
305
306
Substrate
401
403
Chuck
402

FIG. 4A

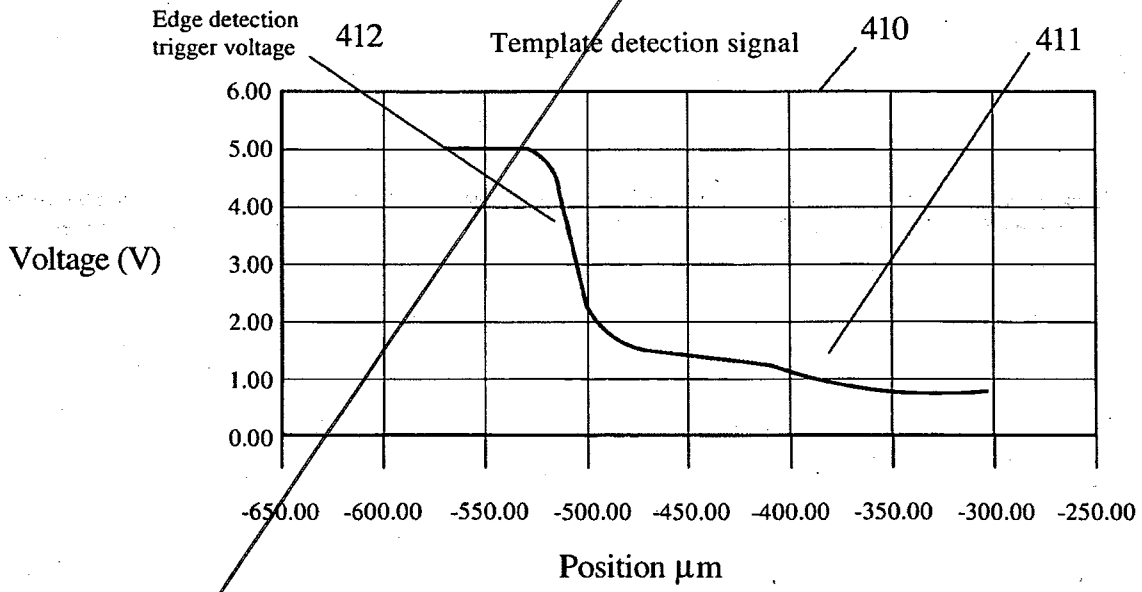

Edge detection trigger voltage
412
Template detection signal
410
411
6.00
5.00
4.00
3.00
2.00
1.00
0.00
Voltage (V)
-650.00
-600.00
-550.00
-500.00
-450.00
-400.00
-350.00
-300.00
-250.00
Position µm

FIG. 4B

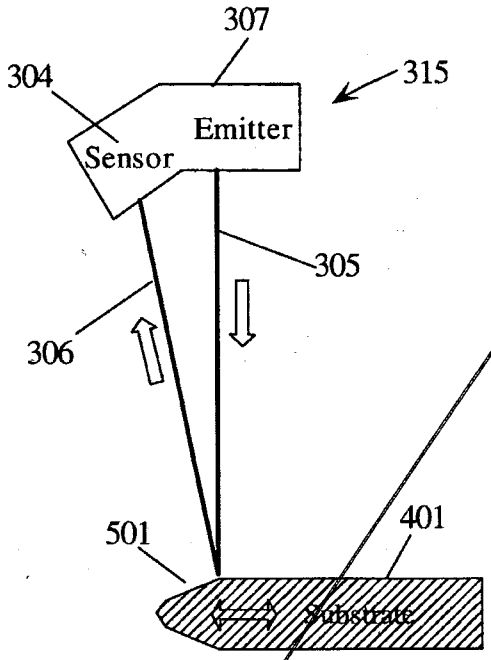


FIG. 5

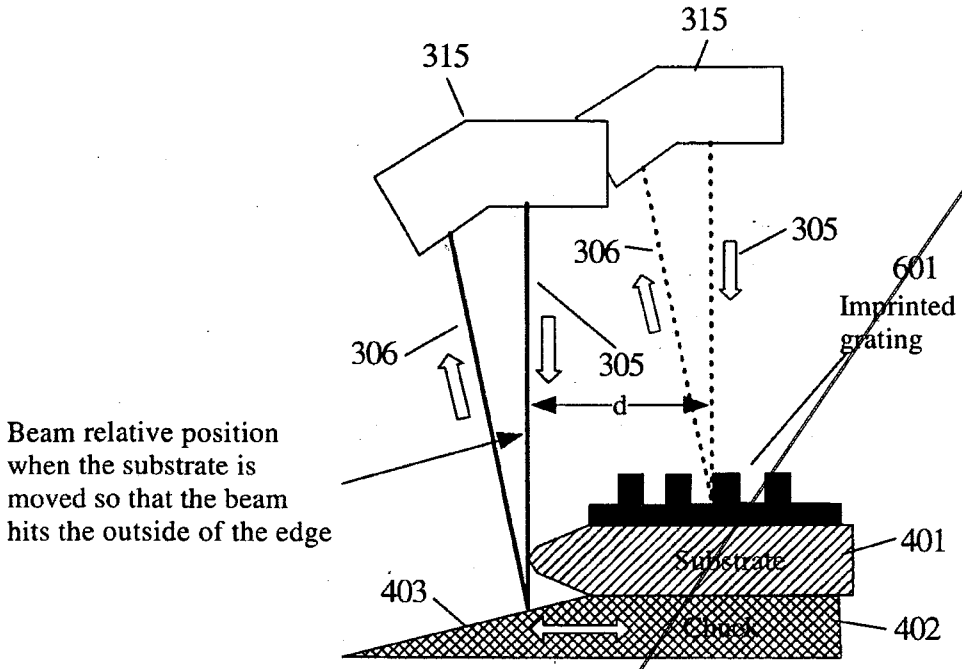

315
315
305
306
601
Imprinted
grating
306
305
d
Beam relative position
when the substrate is
moved so that the beam
hits the outside of the edge
401
Substrate
403
402

FIG. 6A

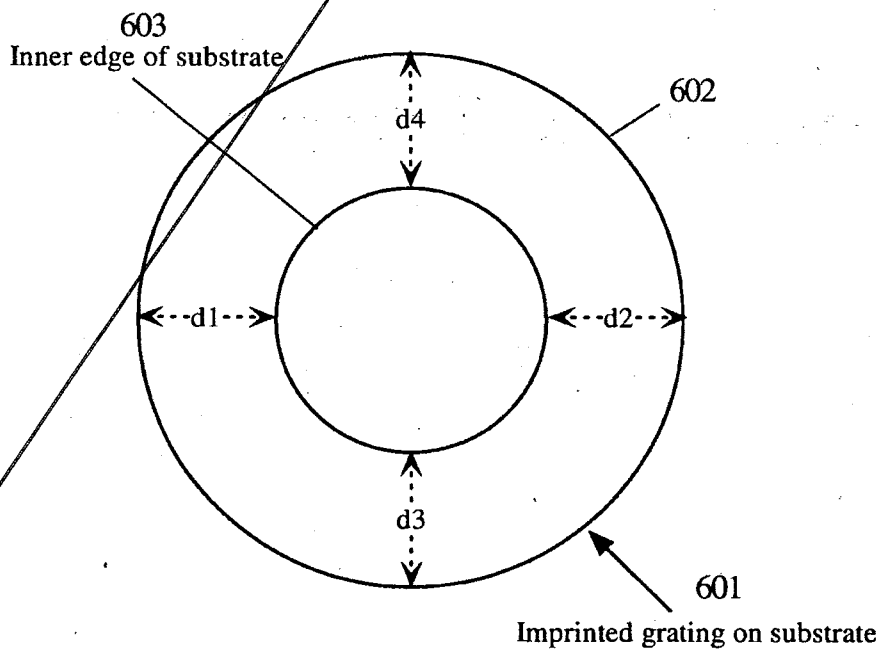

603
Inner edge of substrate
602
d4
d1
d2
d3
601
Imprinted grating on substrate

FIG. 6B

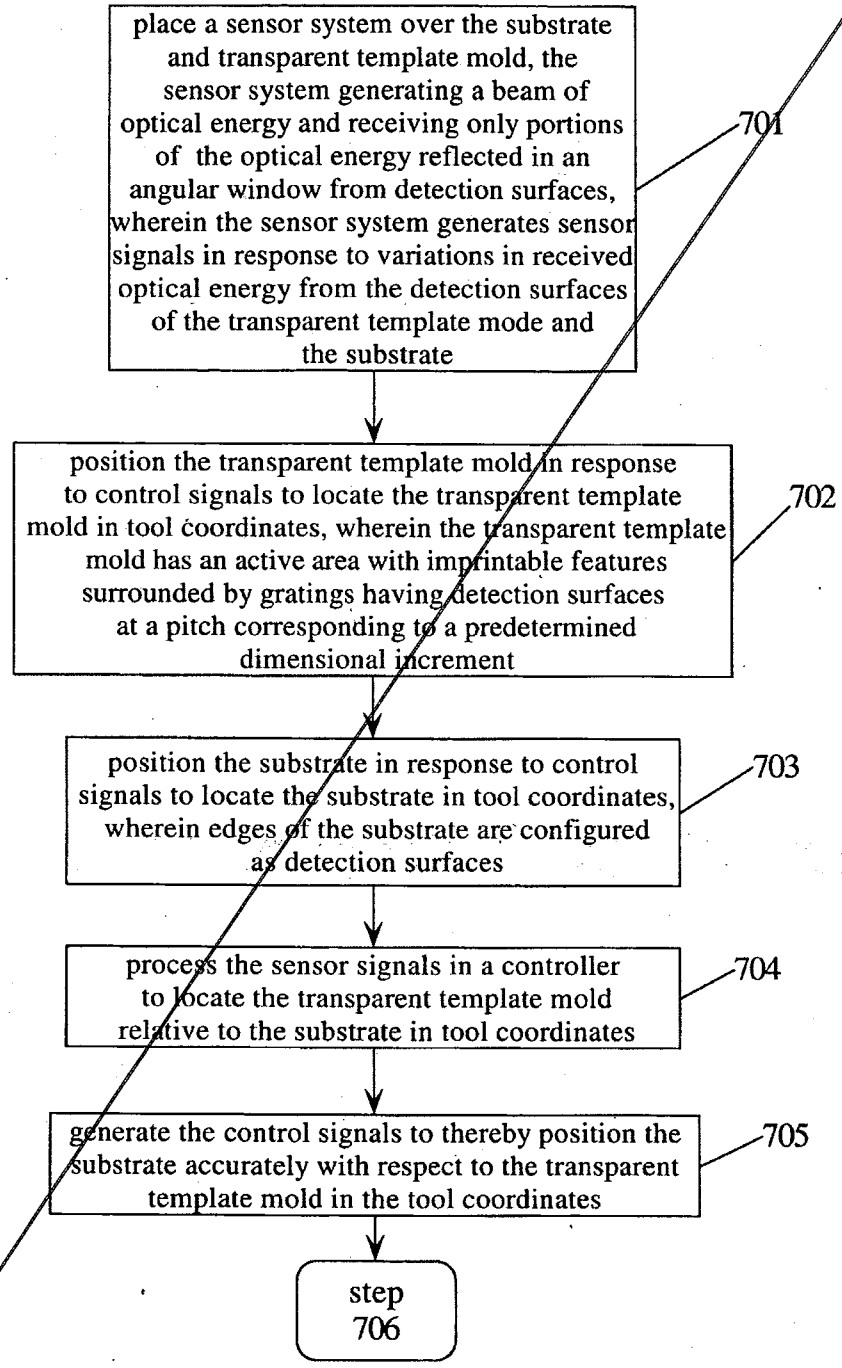

place a sensor system over the substrate and transparent template mold, the sensor system generating a beam of optical energy and receiving only portions of the optical energy reflected in an angular window from detection surfaces, wherein the sensor system generates sensor signals in response to variations in received optical energy from the detection surfaces of the transparent template mode and the substrate
701
position the transparent template mold in response to control signals to locate the transparent template mold in tool coordinates, wherein the transparent template mold has an active area with imprintable features surrounded by gratings having detection surfaces at a pitch corresponding to a predetermined dimensional increment
702
position the substrate in response to control signals to locate the substrate in tool coordinates, wherein edges of the substrate are configured as detection surfaces
703
process the sensor signals in a controller to locate the transparent template mold relative to the substrate in tool coordinates
704
generate the control signals to thereby position the substrate accurately with respect to the transparent template mold in the tool coordinates
705
step 706

FIG. 7A

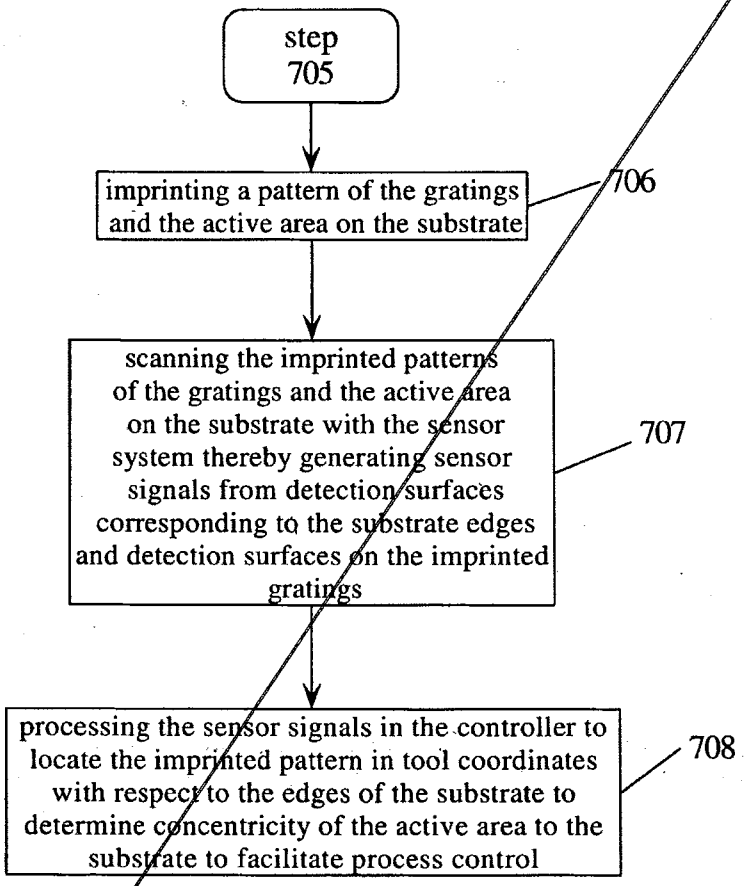

step
705
imprinting a pattern of the gratings and the active area on the substrate
706
scanning the imprinted patterns of the gratings and the active area on the substrate with the sensor system thereby generating sensor signals from detection surfaces corresponding to the substrate edges and detection surfaces on the imprinted gratings
707
processing the sensor signals in the controller to locate the imprinted pattern in tool coordinates with respect to the edges of the substrate to determine concentricity of the active area to the substrate to facilitate process control
708

FIG. 7B

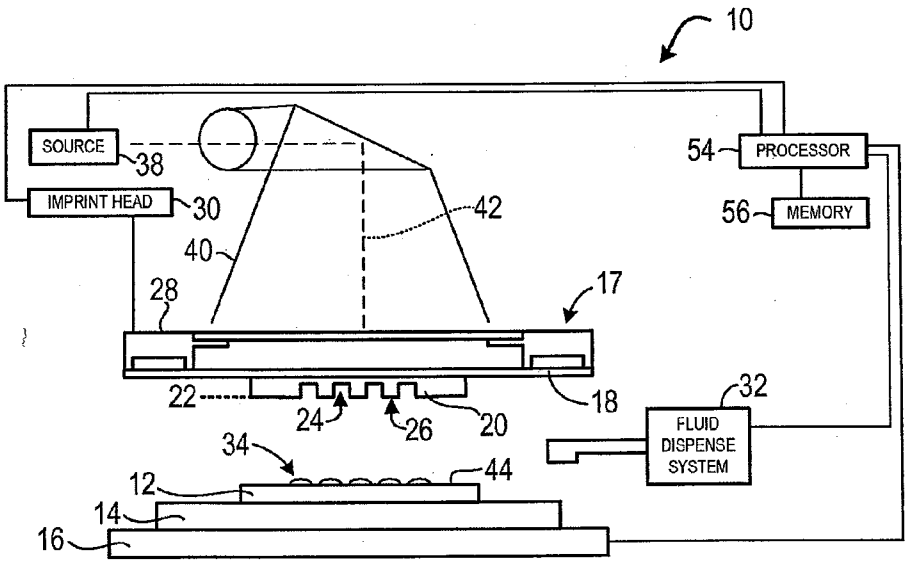

10
SOURCE
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IMPRINT HEAD
30
40
42
28
17
22
24
26
20
18
54
PROCESSOR
56
MEMORY
32
FLUID
DISPENSE
SYSTEM
34
44
12
14
16

FIG. 1

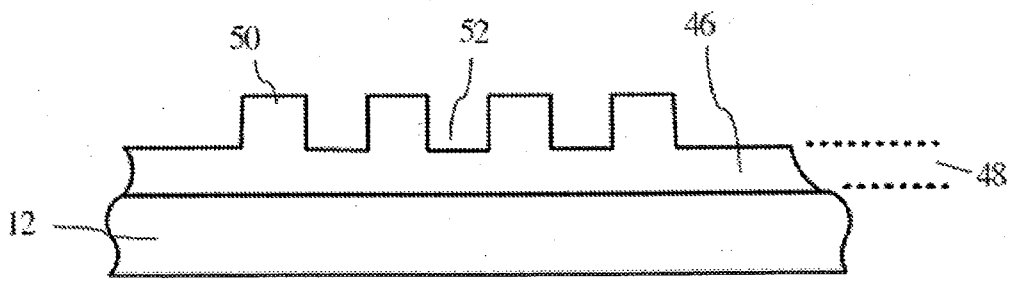

50
52
46
48
12

FIG. 2

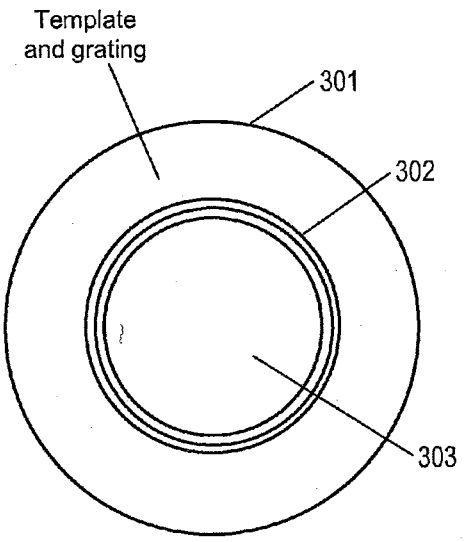


FIG. 3A

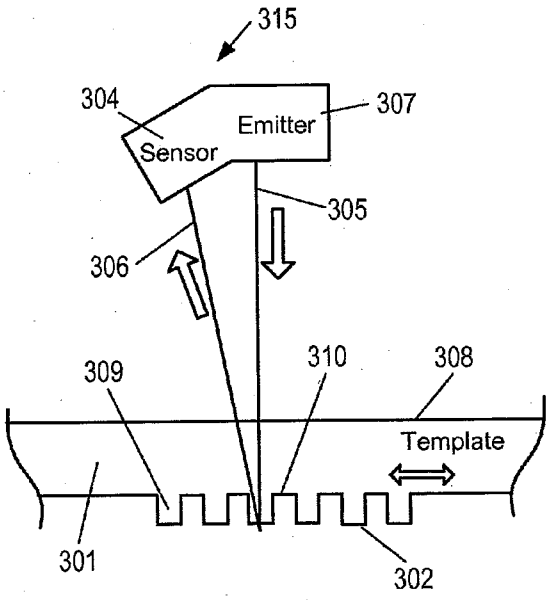


FIG. 3B

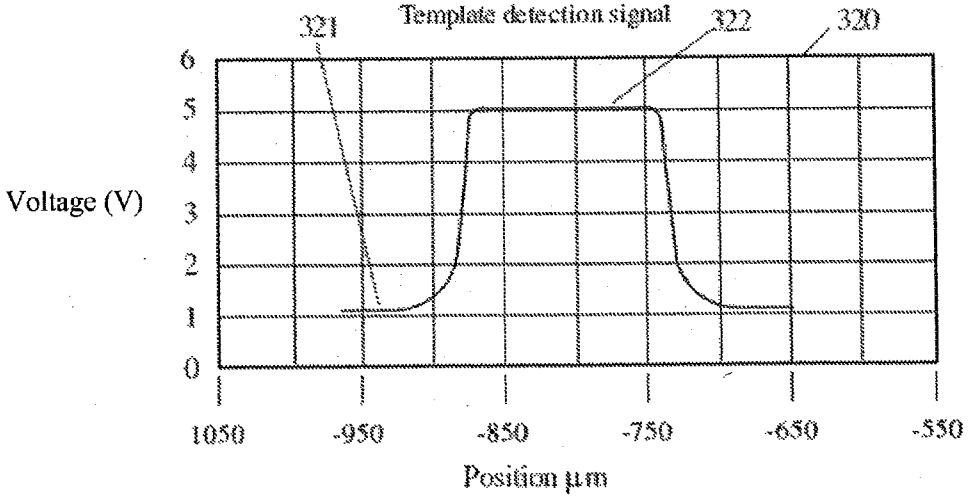


FIG. 3C

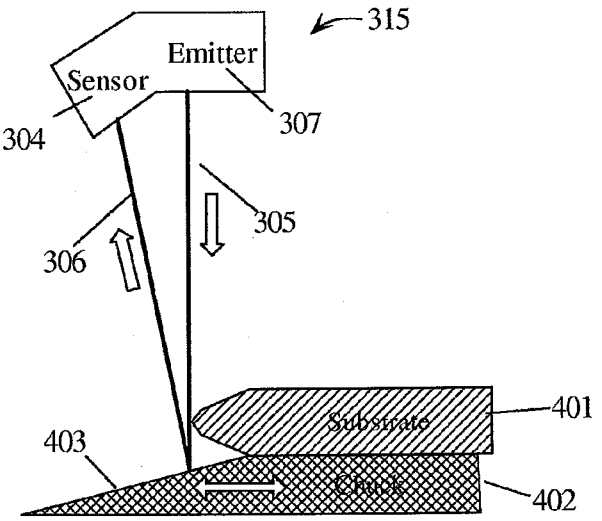

315
Emitter
Sensor
304
307
305
306
401
Substrate
403
Chuck
402

FIG. 4A

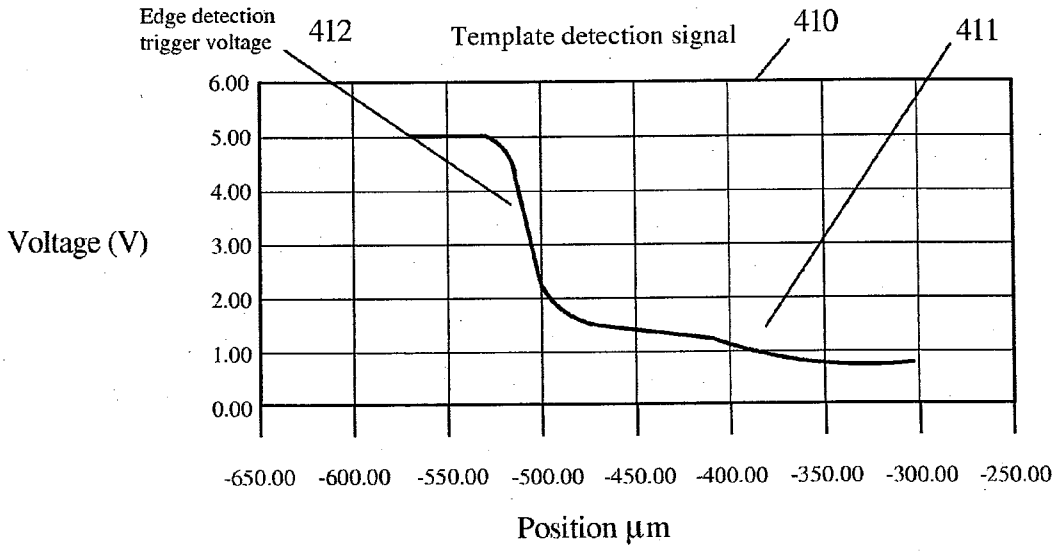

Edge detection trigger voltage
412
Template detection signal
410
411
Voltage (V)
6.00
5.00
4.00
3.00
2.00
1.00
0.00
-650.00
-600.00
-550.00
-500.00
-450.00
-400.00
-350.00
-300.00
-250.00
Position µm

FIG. 4B

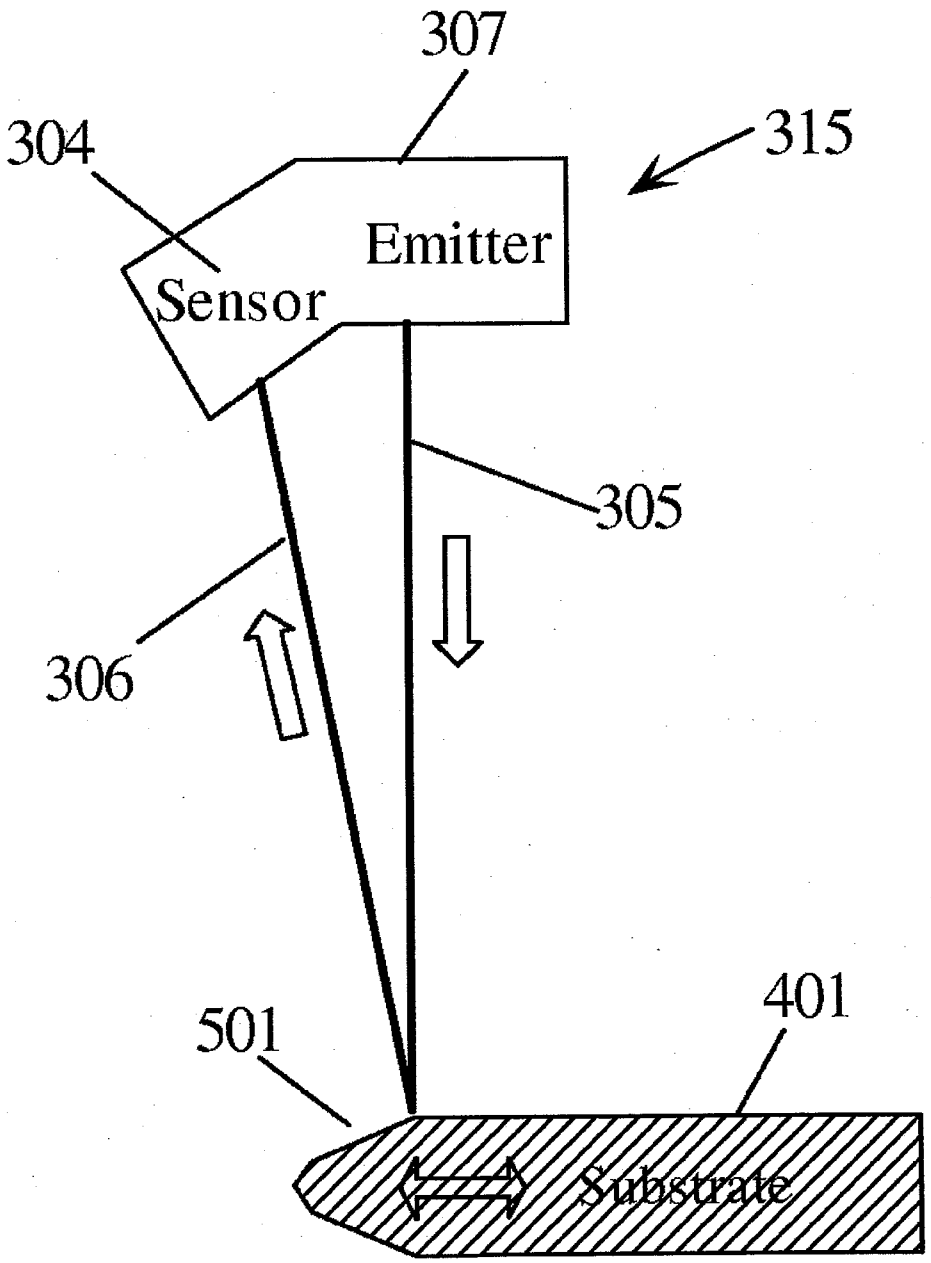


FIG. 5

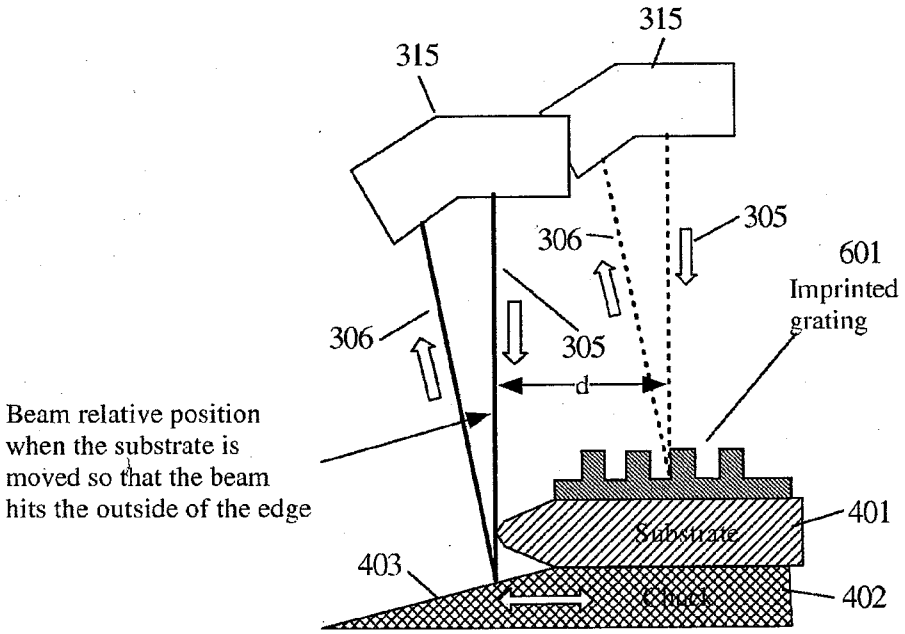

315
315
305
306
601
Imprinted
grating
306
305
d
Beam relative position
when the substrate is
moved so that the beam
hits the outside of the edge
401
Substrate
403
402
Chuck

FIG. 6A

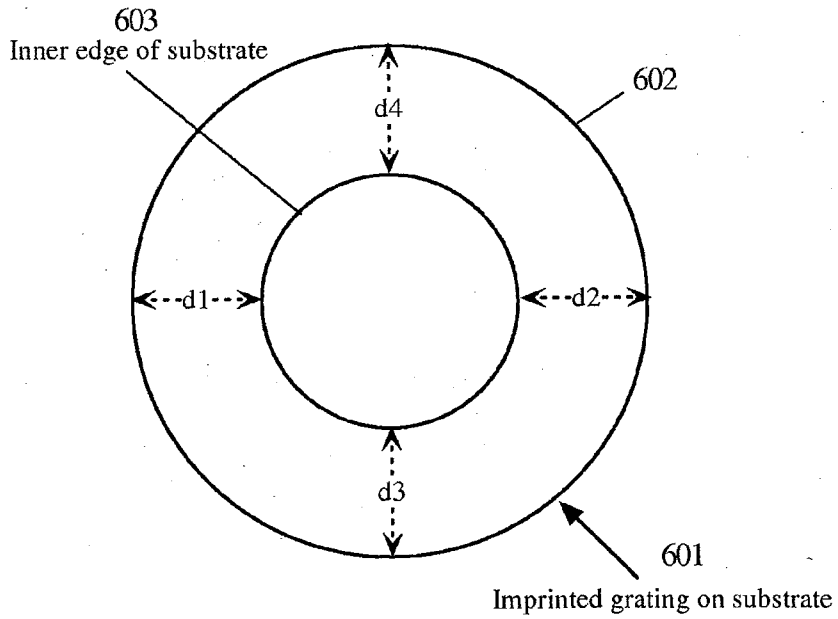

603
Inner edge of substrate
602
d4
d1
d2
d3
601
Imprinted grating on substrate

FIG. 6B

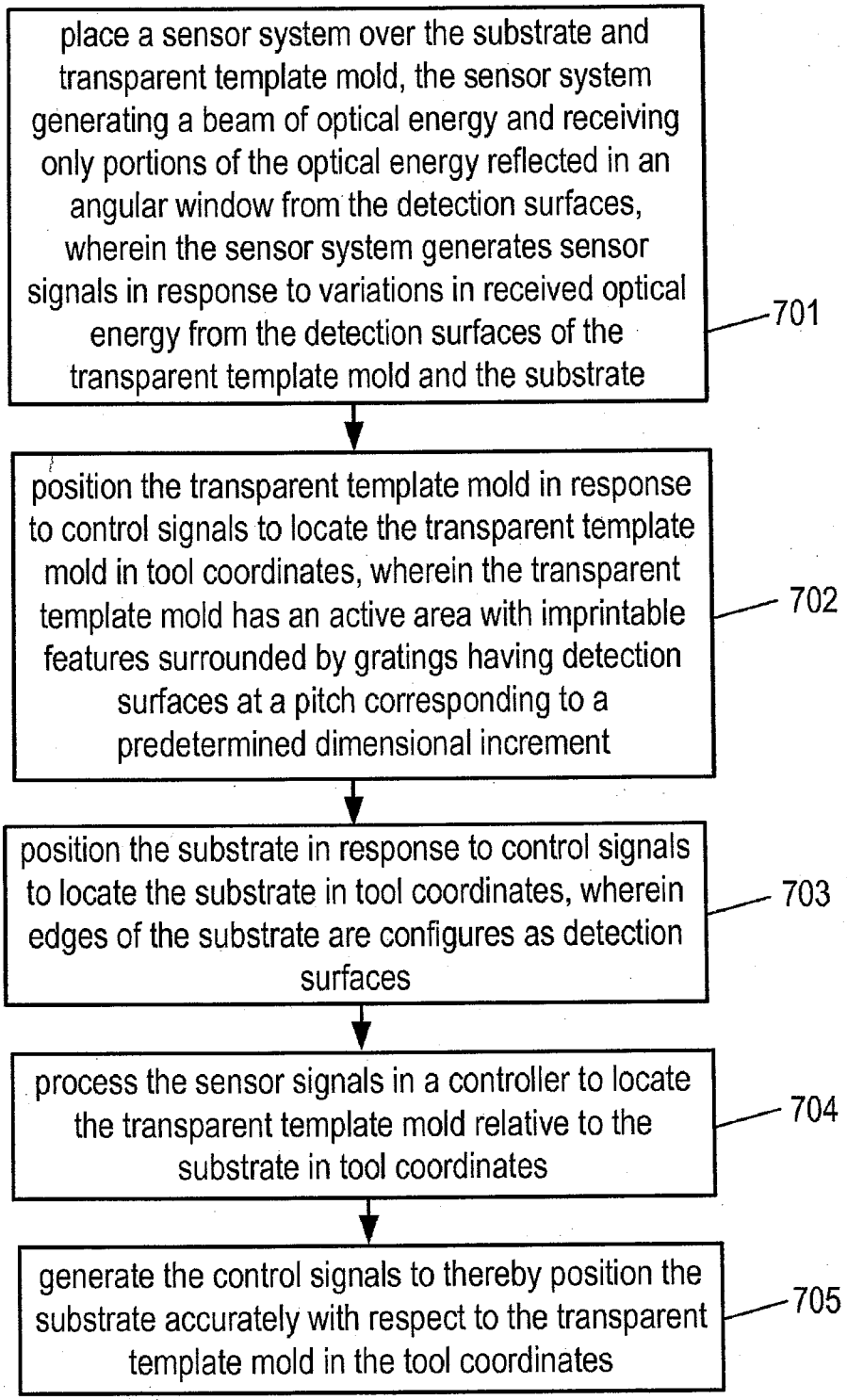

place a sensor system over the substrate and transparent template mold, the sensor system generating a beam of optical energy and receiving only portions of the optical energy reflected in an angular window from the detection surfaces, wherein the sensor system generates sensor signals in response to variations in received optical energy from the detection surfaces of the transparent template mold and the substrate
701
position the transparent template mold in response to control signals to locate the transparent template mold in tool coordinates, wherein the transparent template mold has an active area with imprintable features surrounded by gratings having detection surfaces at a pitch corresponding to a predetermined dimensional increment
702
position the substrate in response to control signals to locate the substrate in tool coordinates, wherein edges of the substrate are configures as detection surfaces
703
process the sensor signals in a controller to locate the transparent template mold relative to the substrate in tool coordinates
704
generate the control signals to thereby position the substrate accurately with respect to the transparent template mold in the tool coordinates
705

FIG. 7A

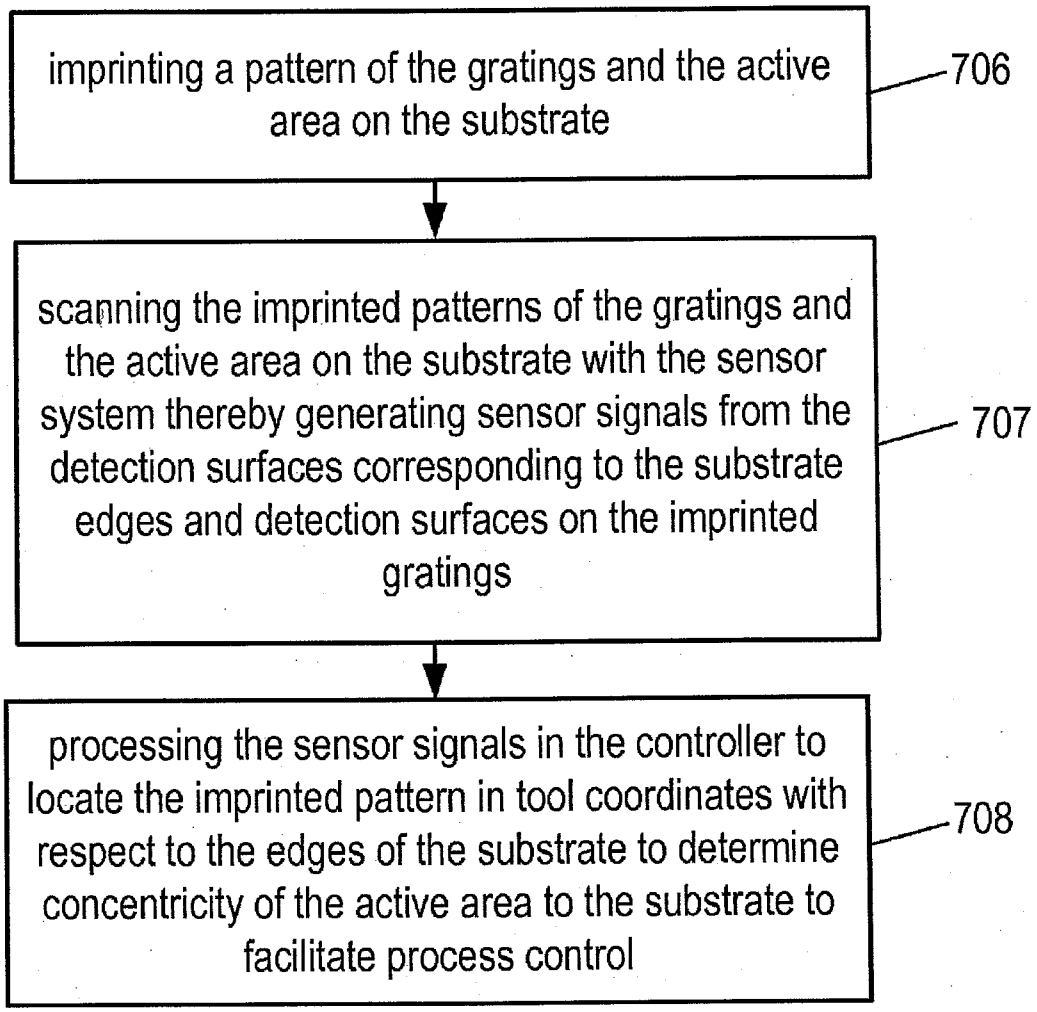

imprinting a pattern of the gratings and the active area on the substrate
706
scanning the imprinted patterns of the gratings and the active area on the substrate with the sensor system thereby generating sensor signals from the detection surfaces corresponding to the substrate edges and detection surfaces on the imprinted gratings
707
processing the sensor signals in the controller to locate the imprinted pattern in tool coordinates with respect to the edges of the substrate to determine concentricity of the active area to the substrate to facilitate process control
708

FIG. 7B