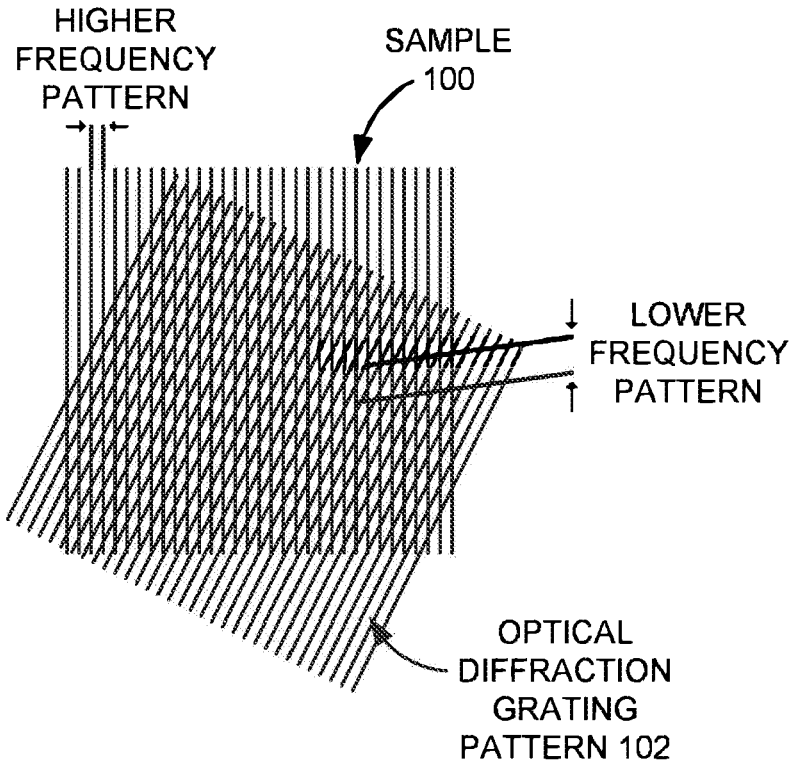

HIGHER
FREQUENCY
PATTERN
SAMPLE
100
LOWER
FREQUENCY
PATTERN
OPTICAL
DIFFRACTION
GRATING
PATTERN 102

FIG. 1A

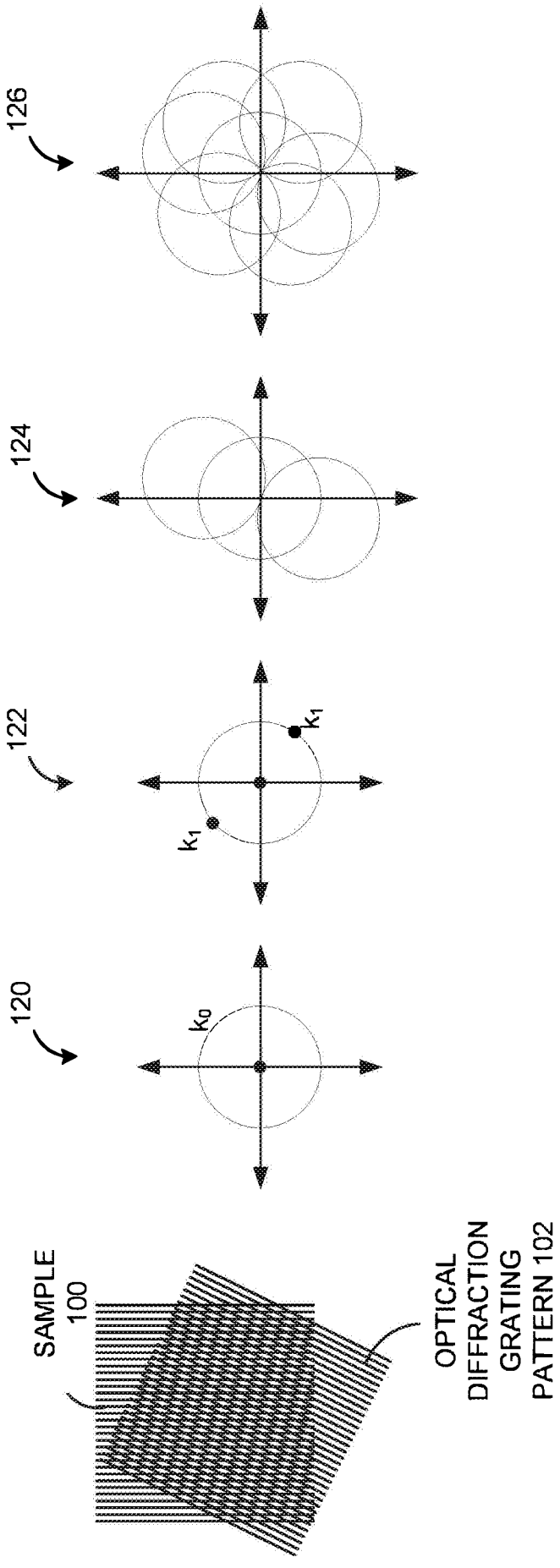

126
124
122
120
k_1
k_1
k_0
SAMPLE 100
OPTICAL DIFFRACTION GRATING PATTERN 102

FIG. 1B

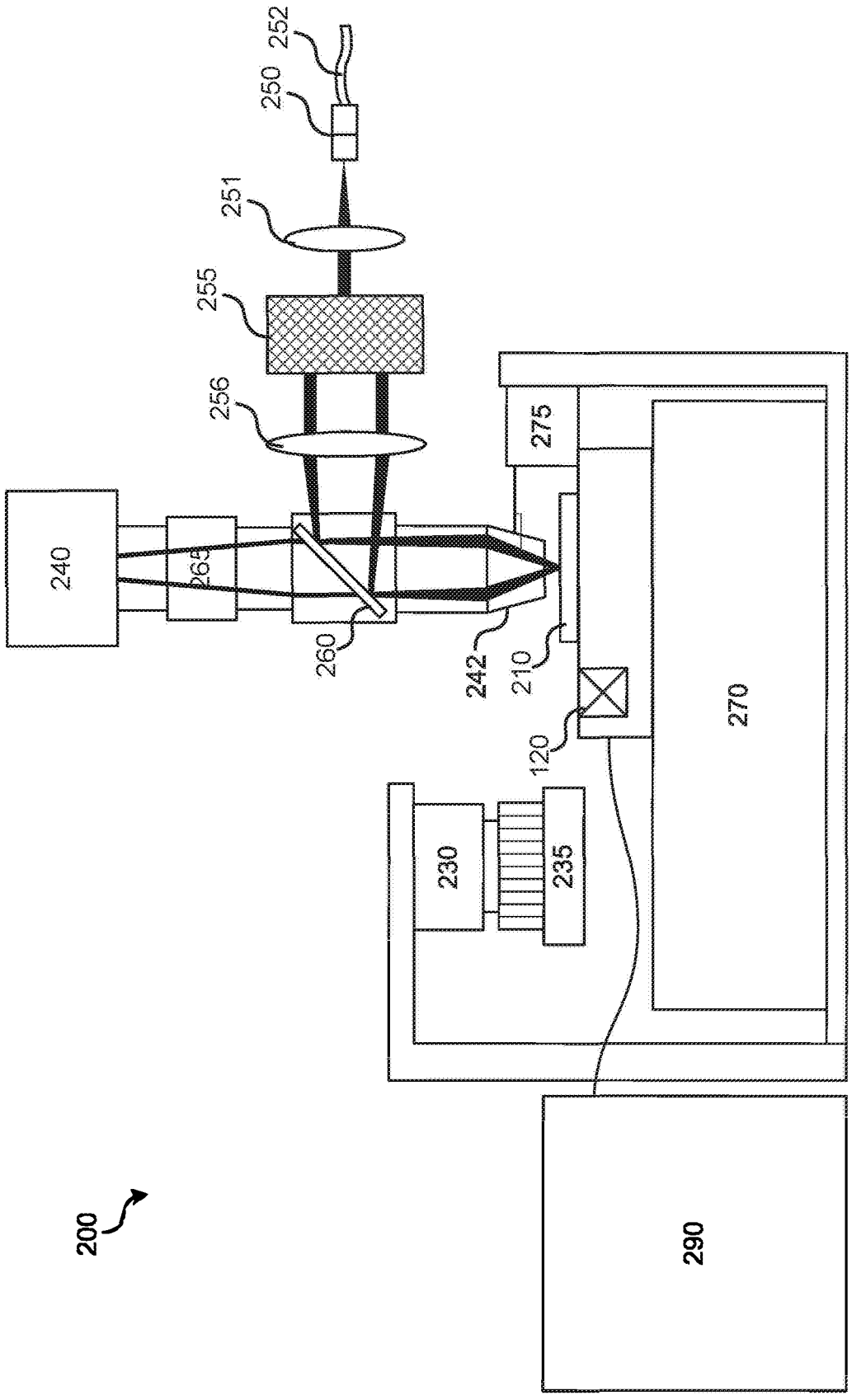


FIG. 2

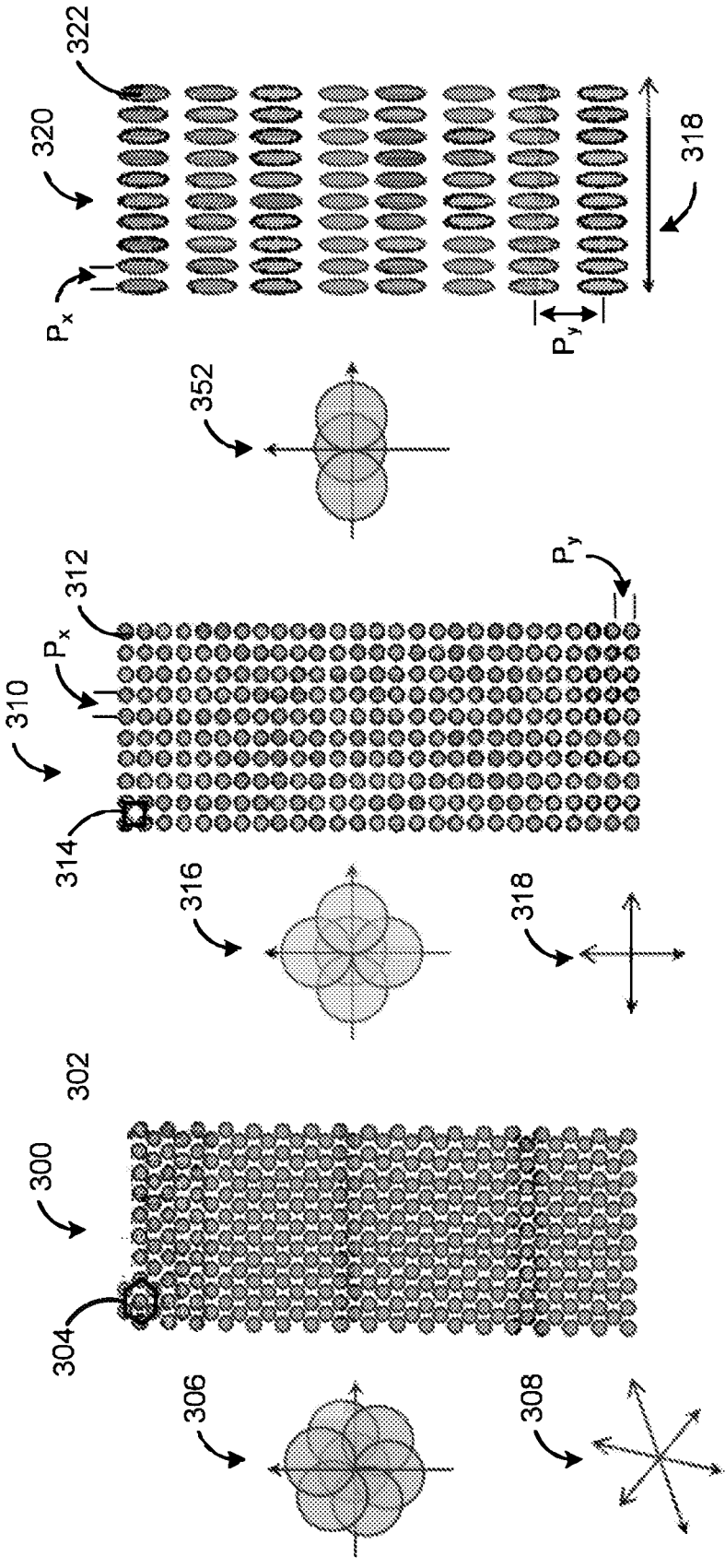


FIG. 3A FIG. 3B FIG. 3C

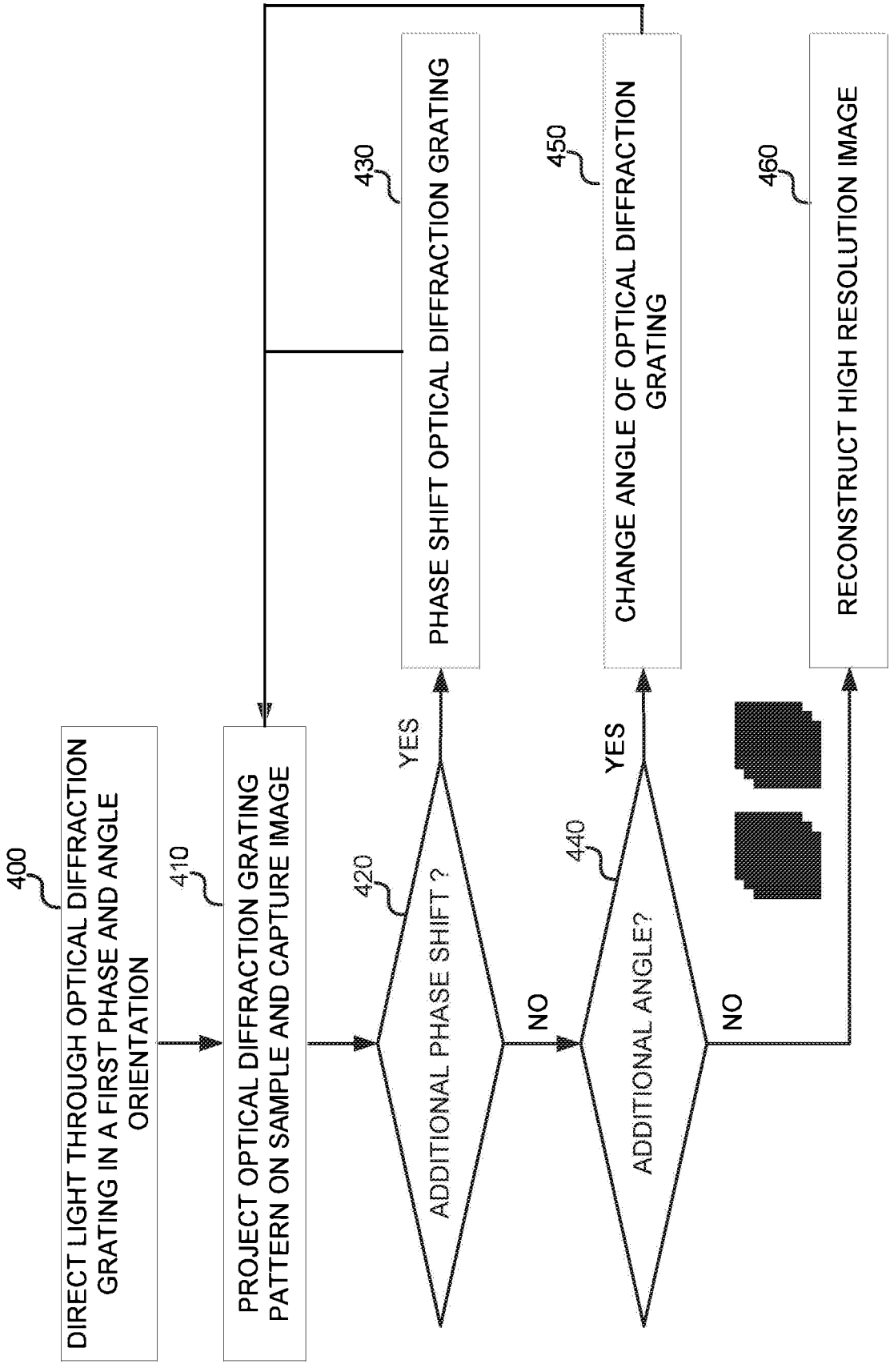

400
DIRECT LIGHT THROUGH OPTICAL DIFFRACTION GRATING IN A FIRST PHASE AND ANGLE ORIENTATION
410
PROJECT OPTICAL DIFFRACTION GRATING PATTERN ON SAMPLE AND CAPTURE IMAGE
420
ADDITIONAL PHASE SHIFT ?
YES
NO
430
PHASE SHIFT OPTICAL DIFFRACTION GRATING
440
ADDITIONAL ANGLE?
YES
NO
450
CHANGE ANGLE OF OPTICAL DIFFRACTION GRATING
460
RECONSTRUCT HIGH RESOLUTION IMAGE

FIG. 4

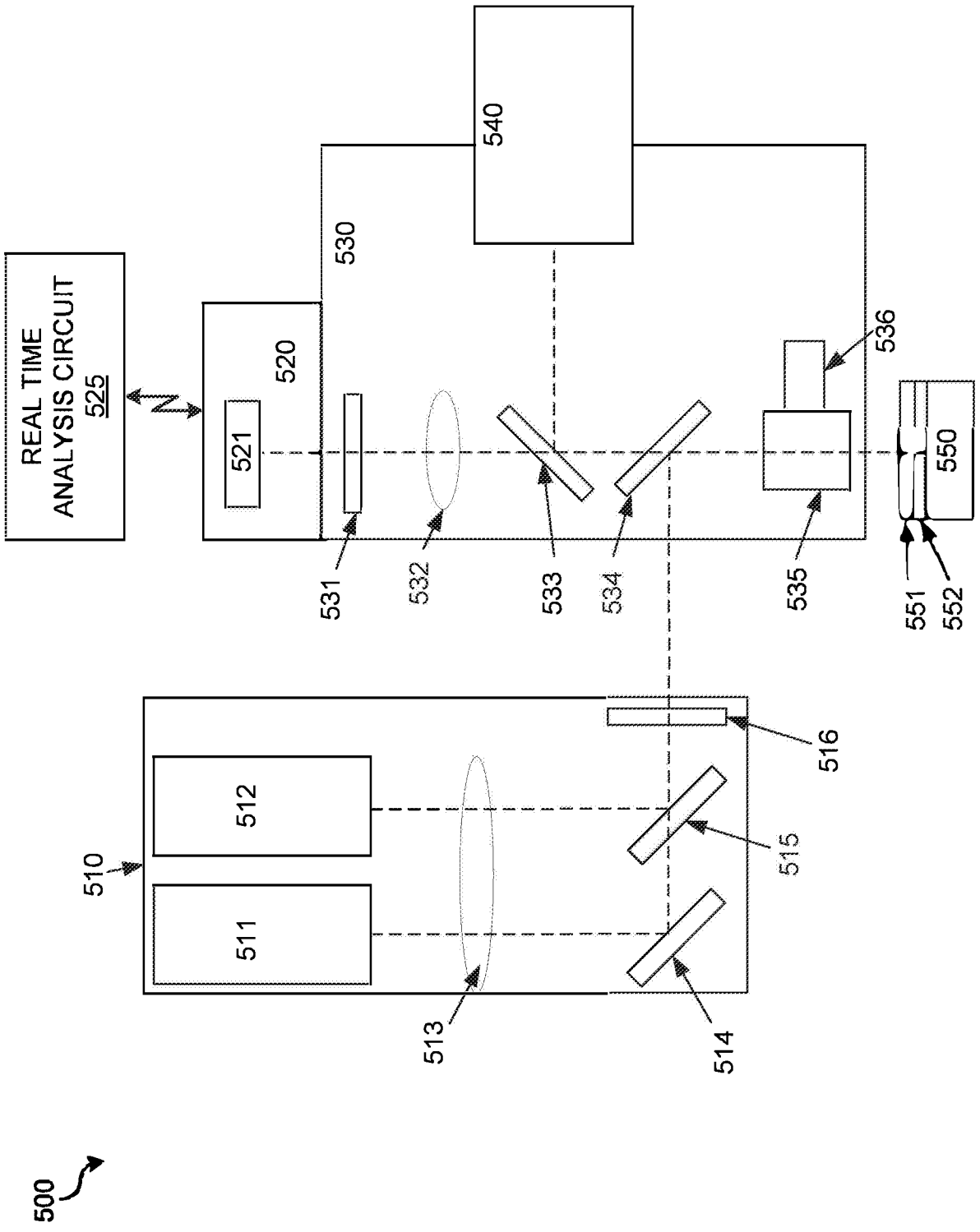

500
REAL TIME ANALYSIS CIRCUIT 525
520
521
530
540
536
550
510
511
512
513
514
515
516
531
532
533
534
535
551
552

FIG. 5

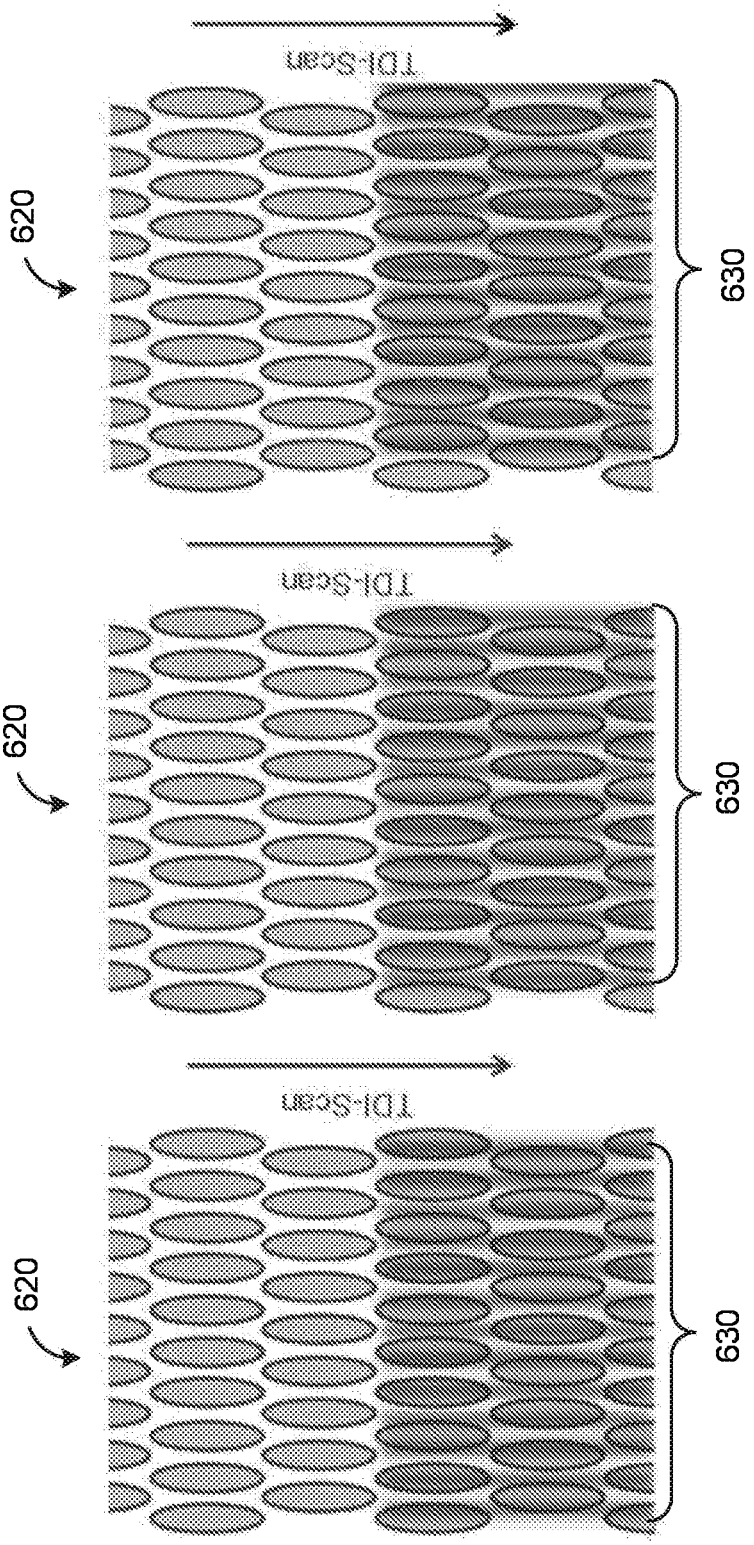


FIG. 6C

FIG. 6B

FIG. 6A

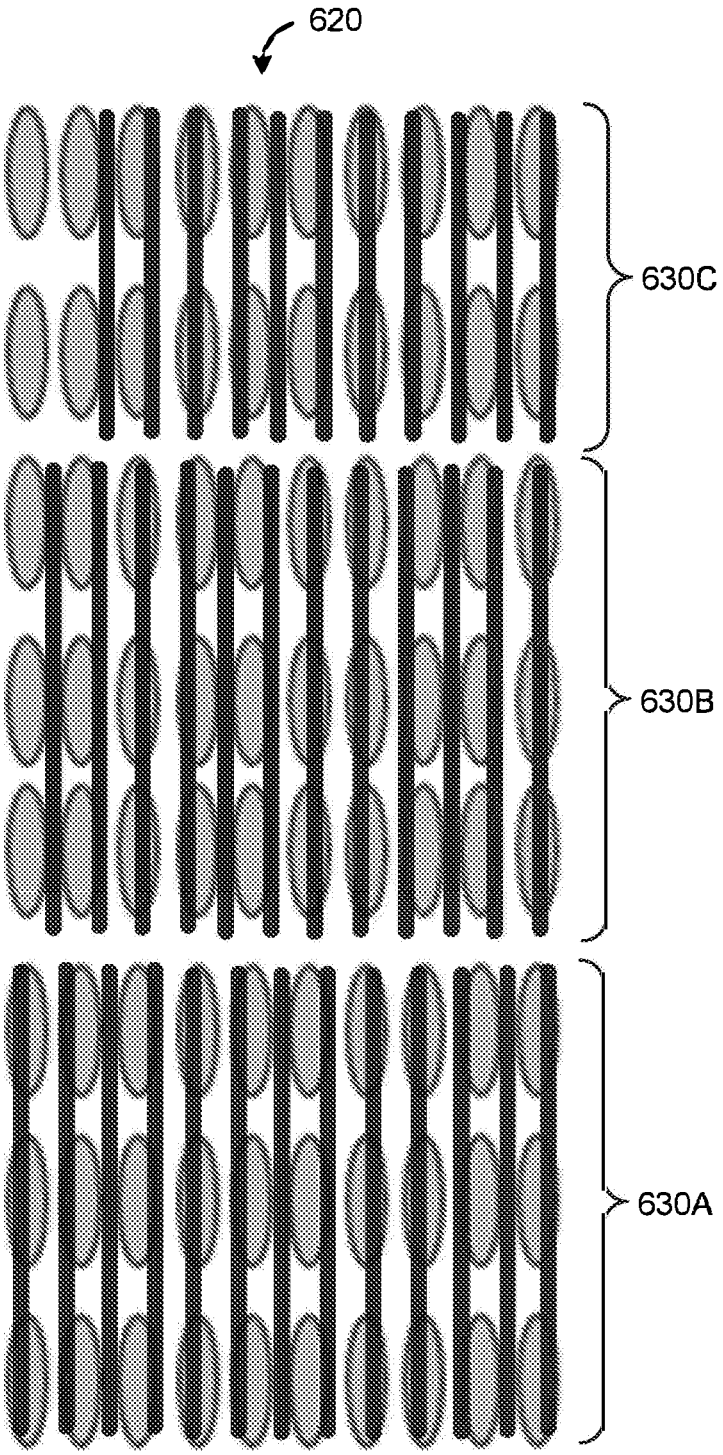


FIG. 6D

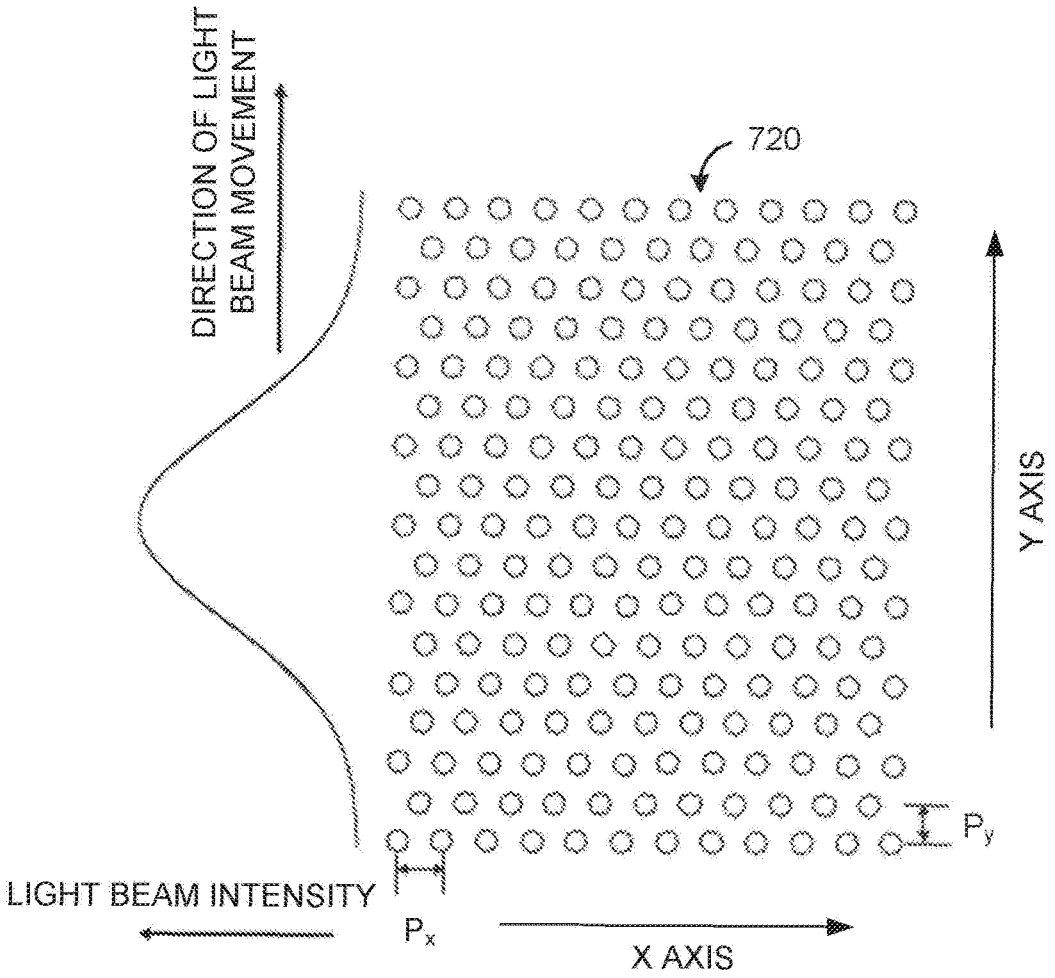

DIRECTION OF LIGHT BEAM MOVEMENT
720
Y AXIS
P_y
LIGHT BEAM INTENSITY
P_x
X AXIS

FIG. 7

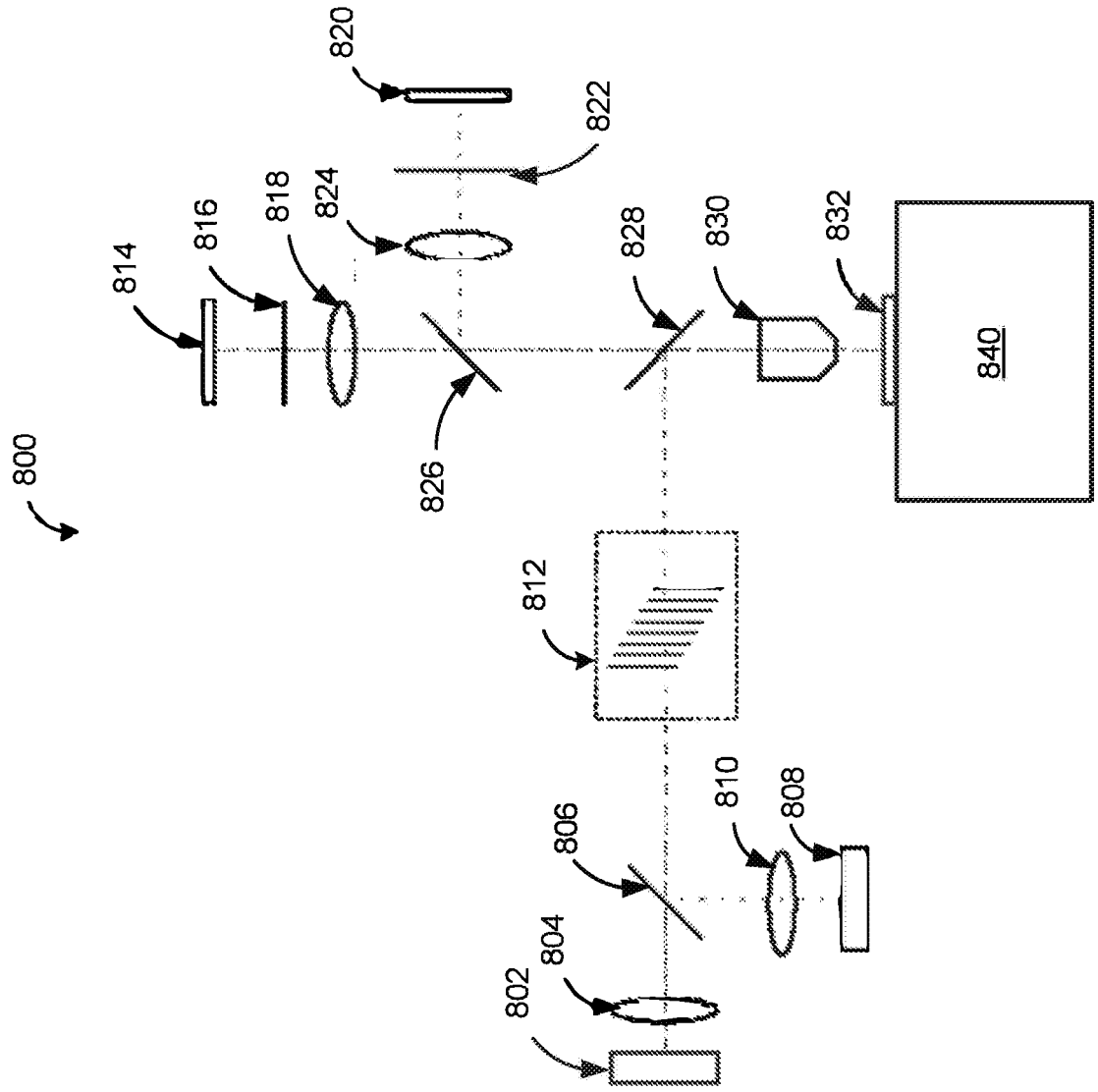

800
802
804
806
808
810
812
814
816
818
820
822
824
826
828
830
832
840

FIG. 8

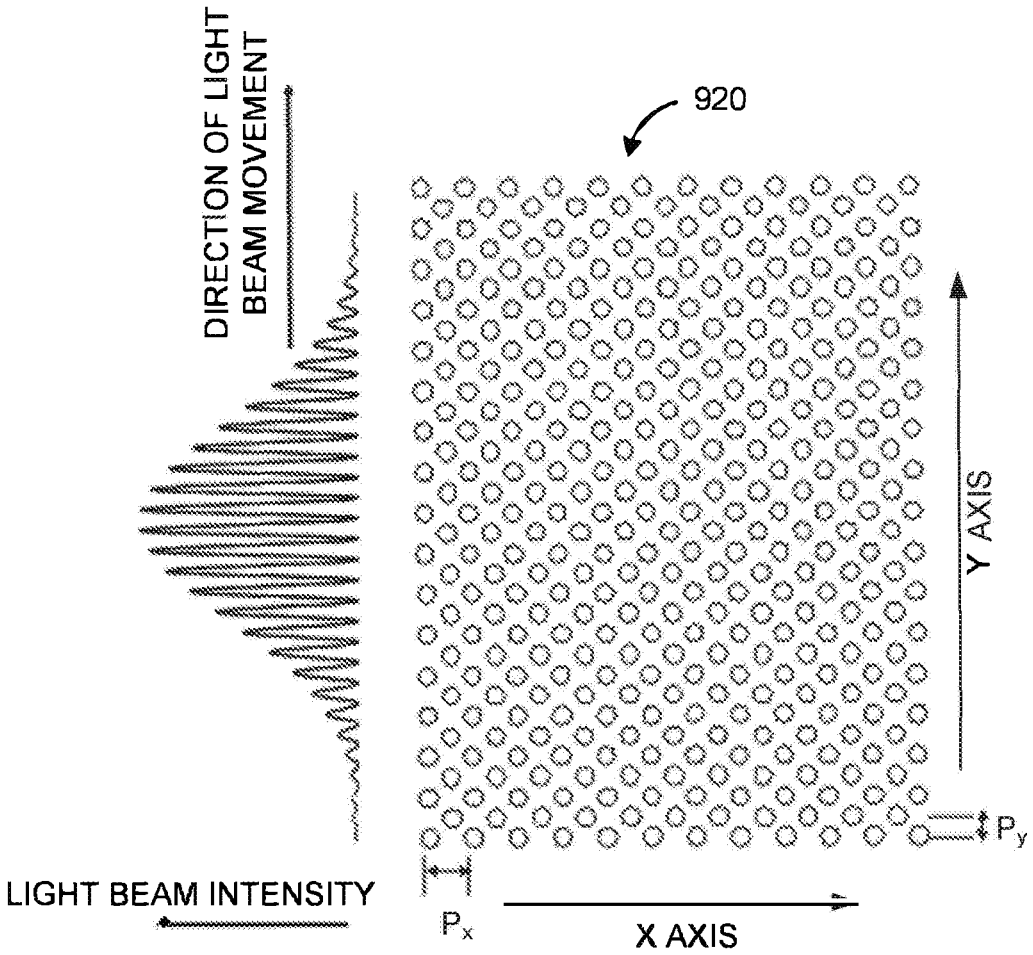

DIRECTION OF LIGHT BEAM MOVEMENT
920
Y AXIS
P_y
LIGHT BEAM INTENSITY
P_x
X AXIS

FIG. 9

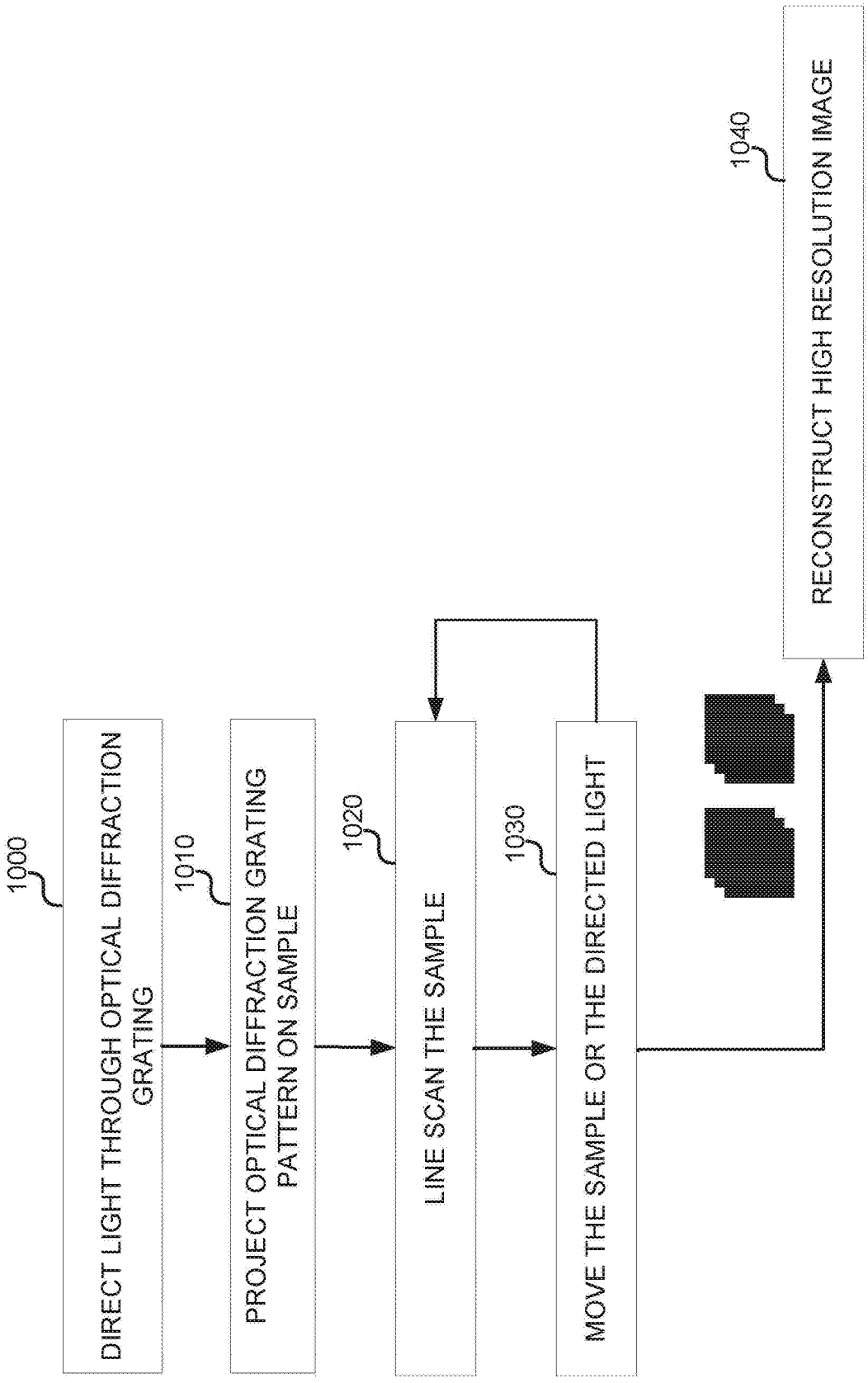

1000
DIRECT LIGHT THROUGH OPTICAL DIFFRACTION GRATING
1010
PROJECT OPTICAL DIFFRACTION GRATING PATTERN ON SAMPLE
1020
LINE SCAN THE SAMPLE
1030
MOVE THE SAMPLE OR THE DIRECTED LIGHT
1040
RECONSTRUCT HIGH RESOLUTION IMAGE

FIG. 10

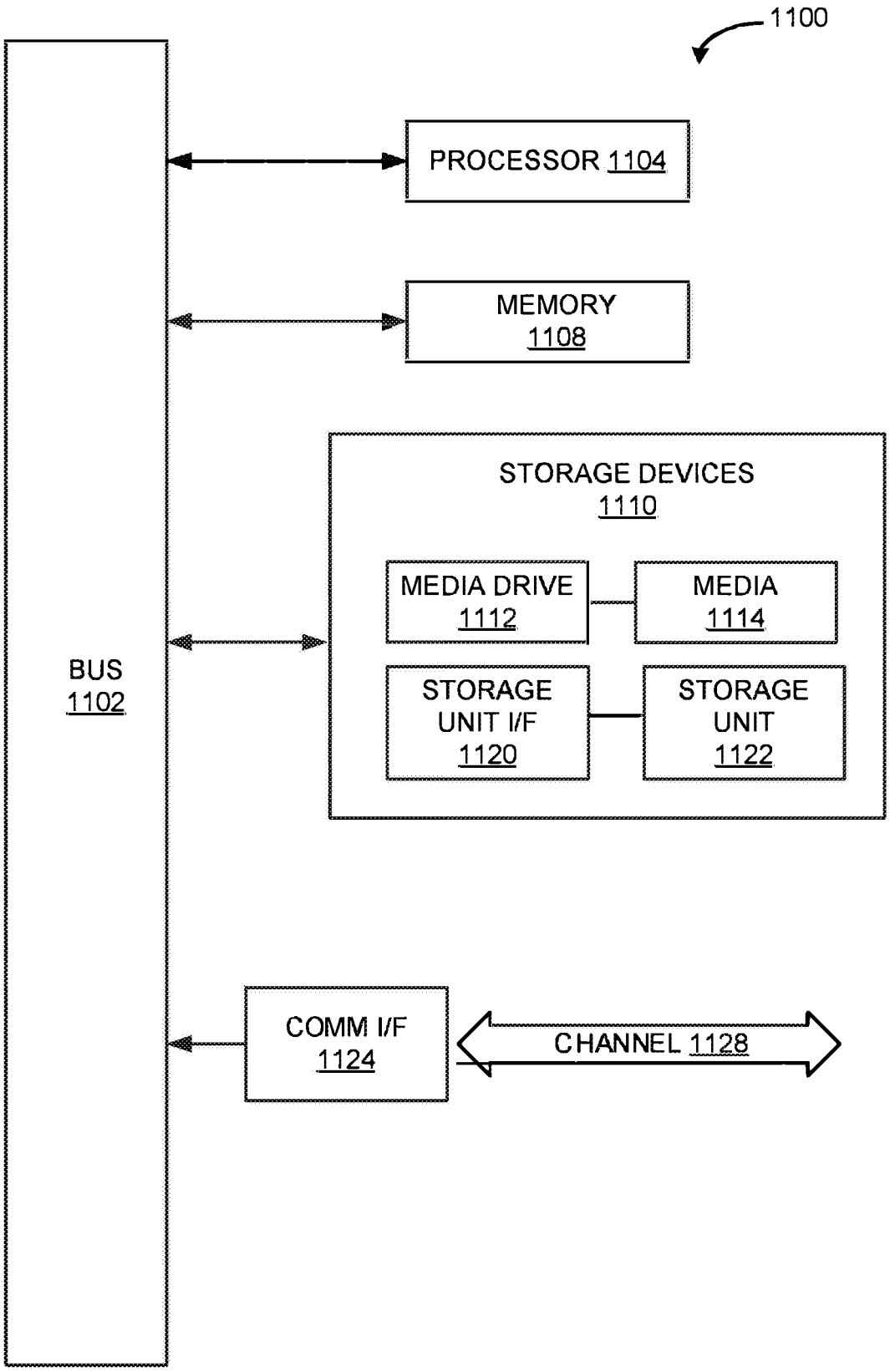

1100
PROCESSOR 1104
MEMORY 1108
STORAGE DEVICES 1110
MEDIA DRIVE 1112
MEDIA 1114
STORAGE UNIT I/F 1120
STORAGE UNIT 1122
BUS 1102
COMM I/F 1124
CHANNEL 1128

FIG. 11

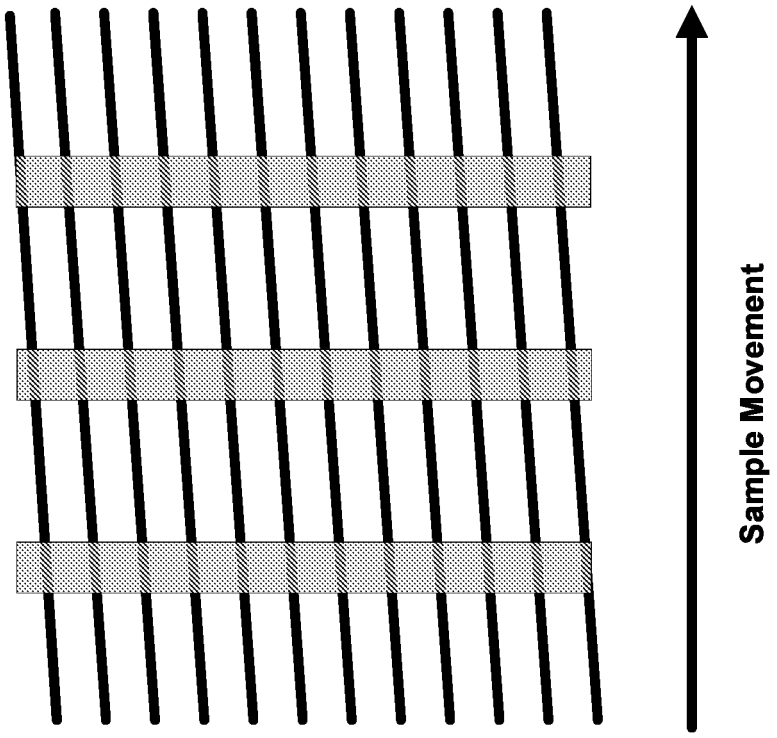


FIG. 12