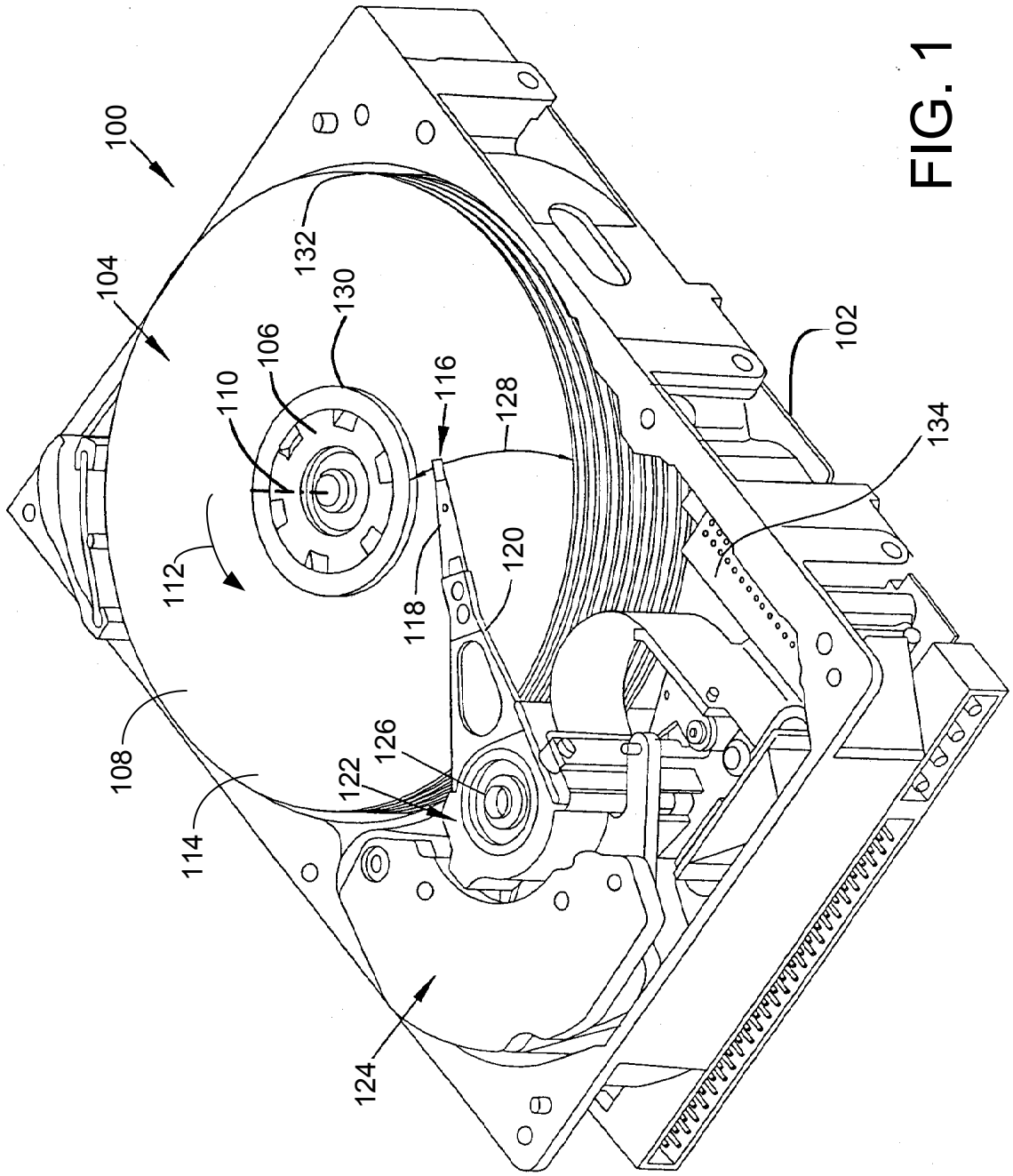

100
104
132
130
106
110
116
128
102
134
112
120
118
108
126
122
114
124

FIG. 1

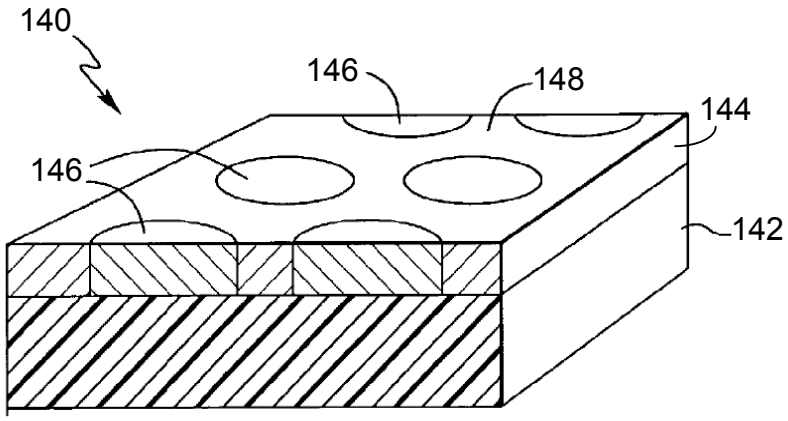

140
146
148
144
146
142

FIG. 2

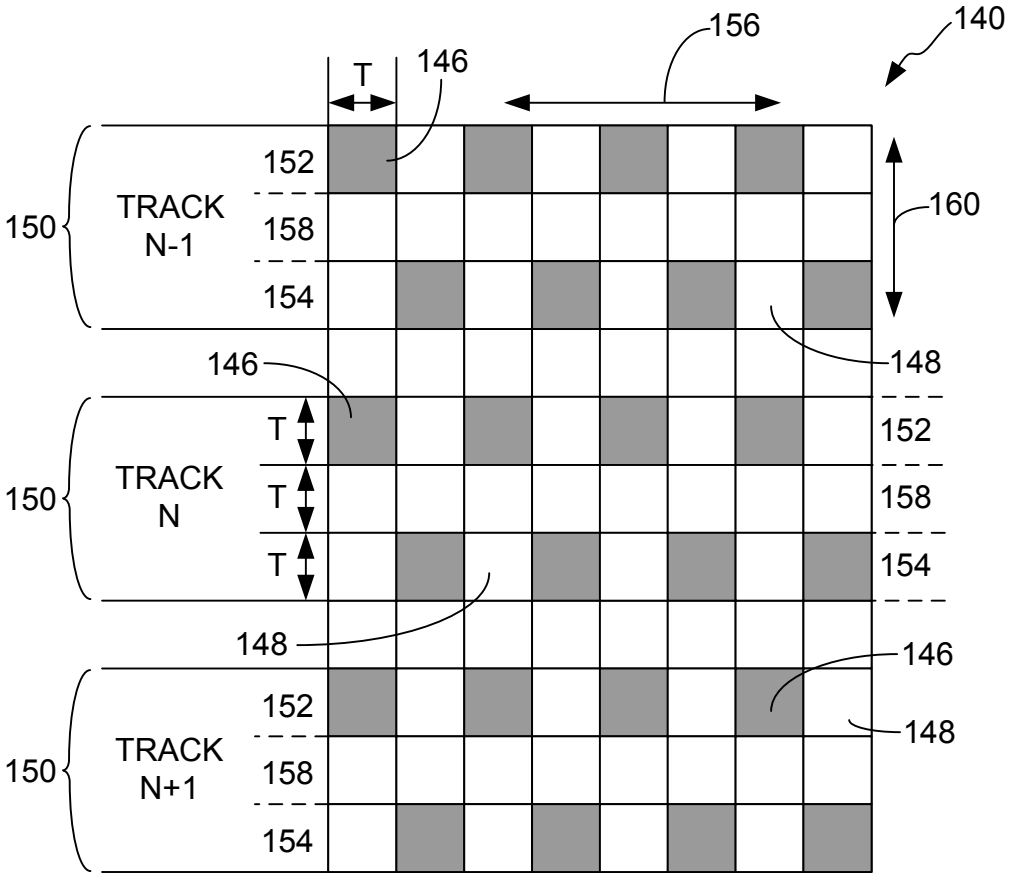

140
156
T
146
152
TRACK
N-1
158
154
150
160
146
148
T
152
T
TRACK
N
158
150
T
154
148
146
152
148
TRACK
N+1
158
150
154

FIG. 3

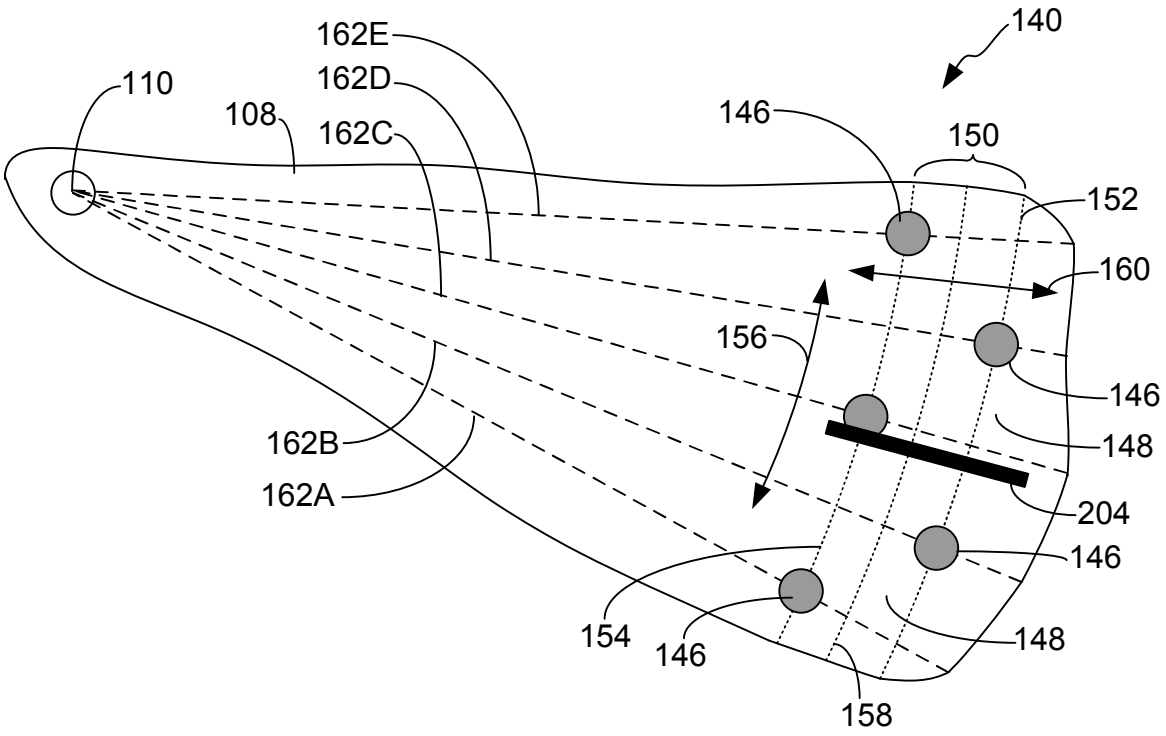

140
162E
162D
110
108
162C
146
150
152
160
156
146
148
162B
162A
204
146
154
146
148
158

FIG. 4

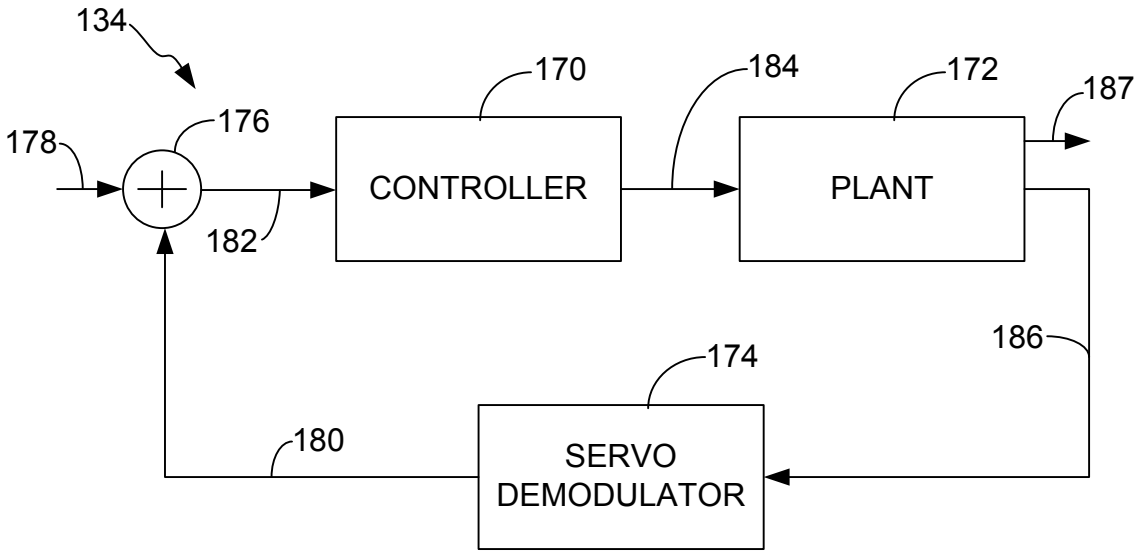

134
170
184
172
187
178
176
CONTROLLER
PLANT
182
186
174
180
SERVO
DEMODULATOR

FIG. 5

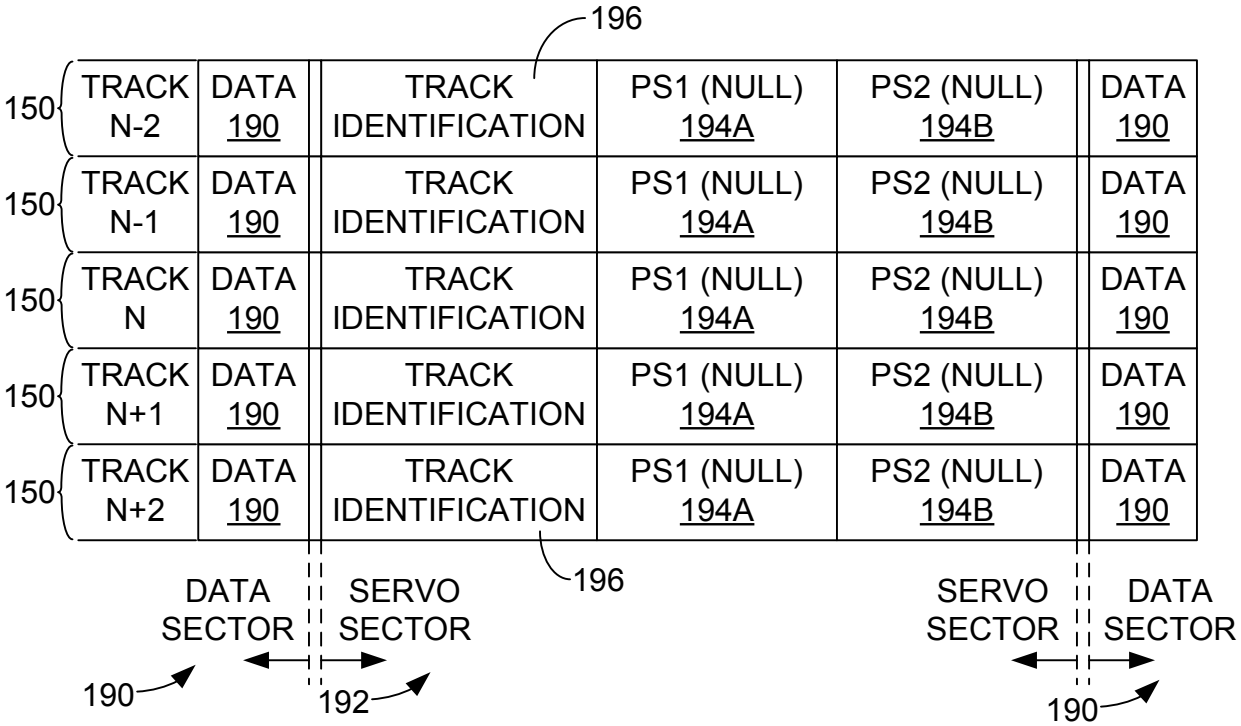

196
150
TRACK N-2
DATA 190
TRACK IDENTIFICATION
PS1 (NULL) 194A
PS2 (NULL) 194B
DATA 190
TRACK N-1
TRACK N
TRACK N+1
TRACK N+2
DATA SECTOR
SERVO SECTOR
190
192

FIG. 6

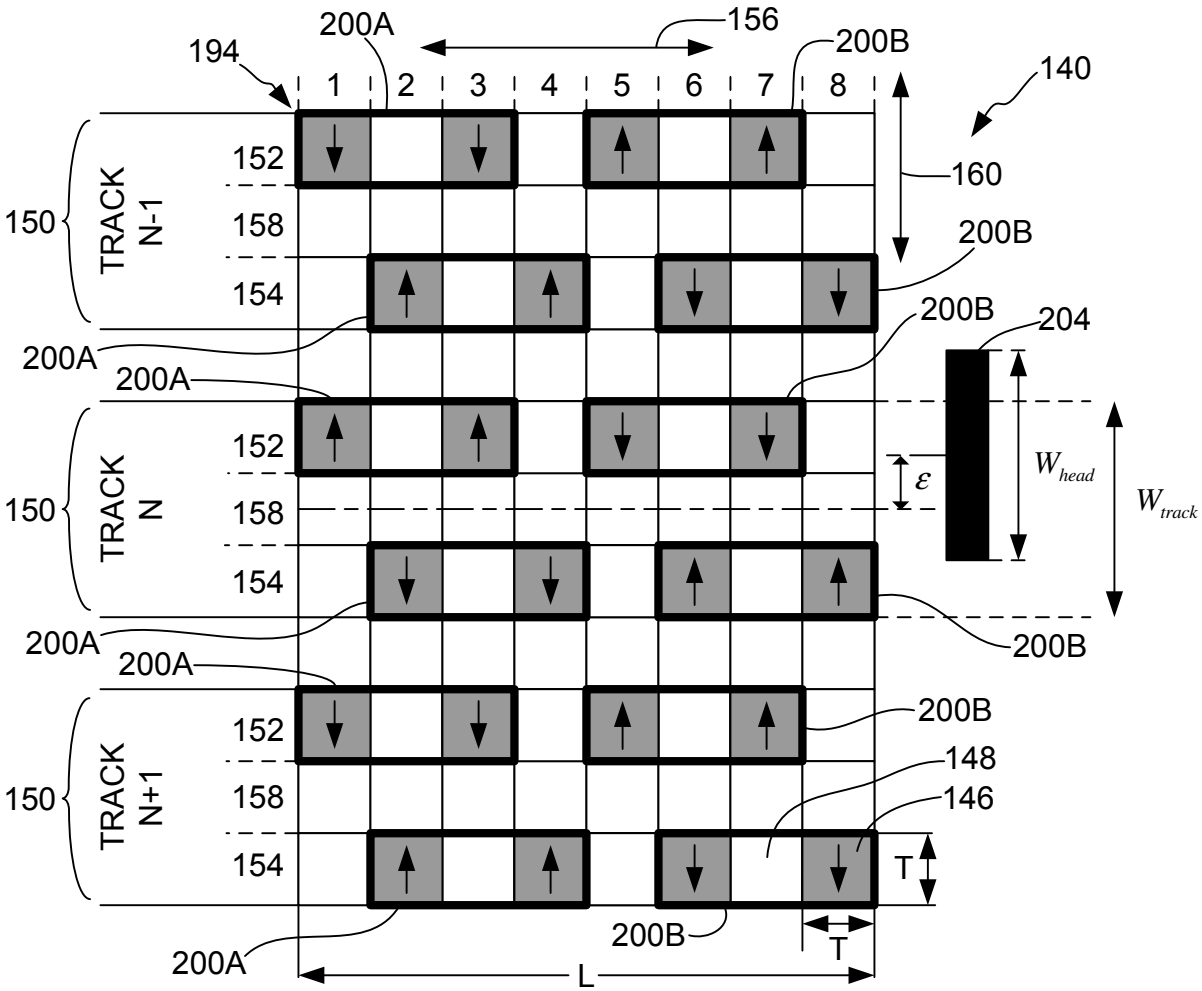

194
200A
156
200B
140
1
2
3
4
5
6
7
8
160
150
TRACK N-1
152
158
154
200A
200B
204
TRACK N
TRACK N+1
W_{head}
W_{track}
ε
148
146
T
L

FIG. 7

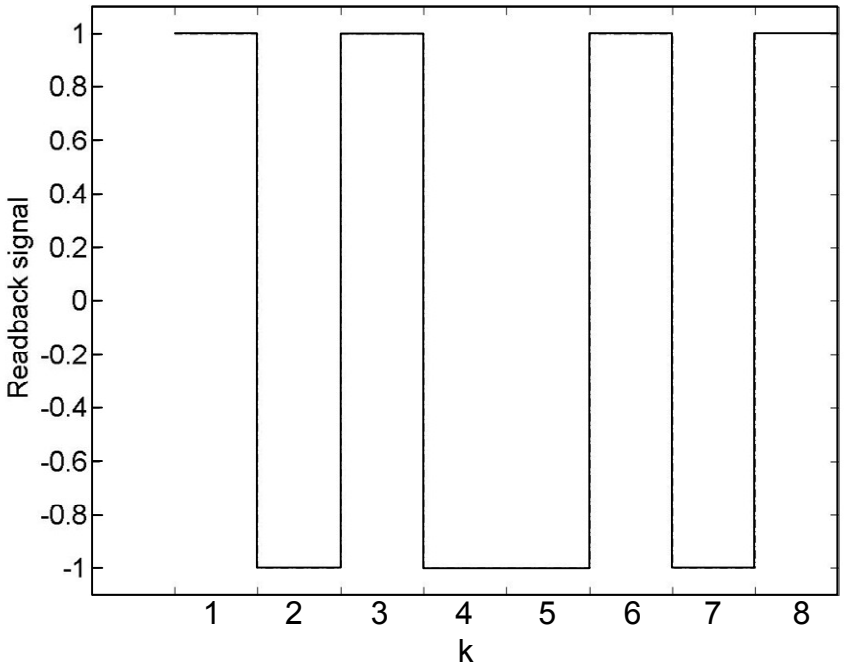


FIG. 8

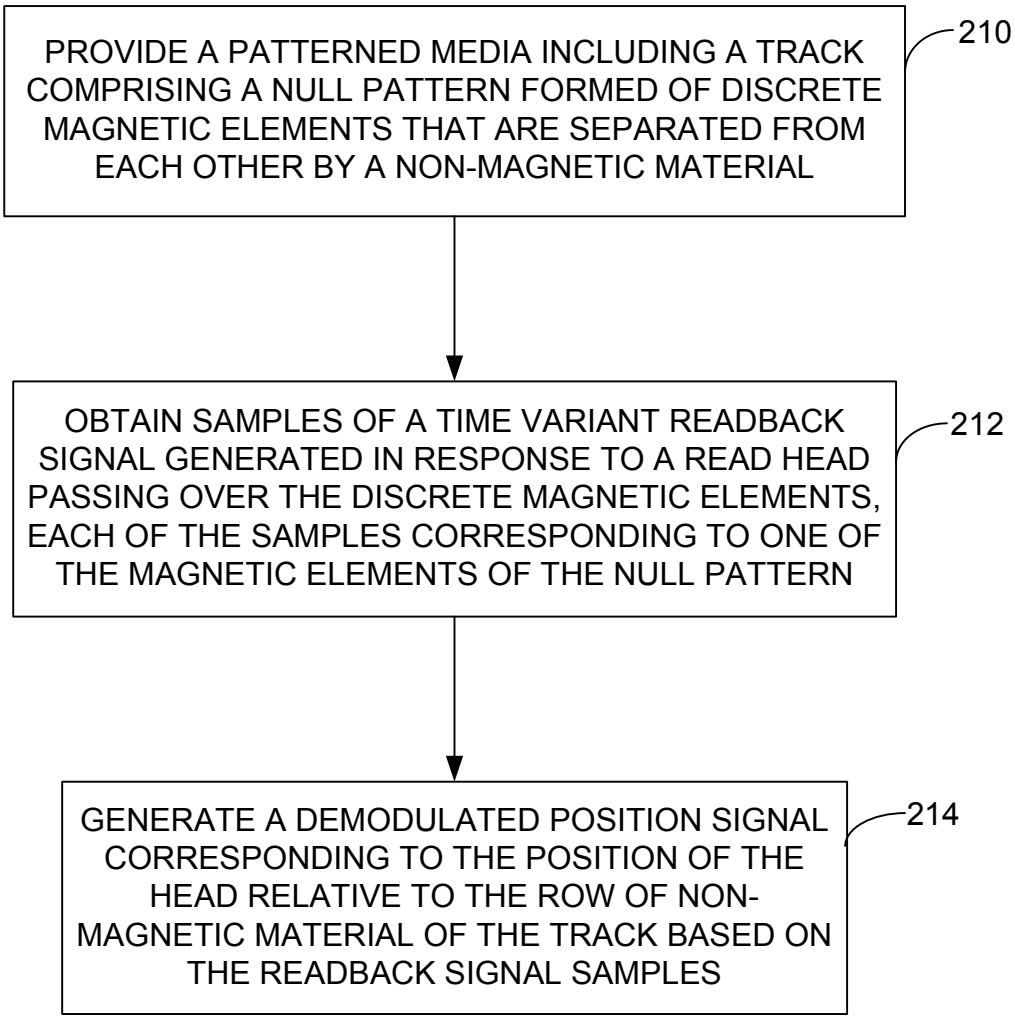

PROVIDE A PATTERNED MEDIA INCLUDING A TRACK COMPRISING A NULL PATTERN FORMED OF DISCRETE MAGNETIC ELEMENTS THAT ARE SEPARATED FROM EACH OTHER BY A NON-MAGNETIC MATERIAL
210
OBTAIN SAMPLES OF A TIME VARIANT READBACK SIGNAL GENERATED IN RESPONSE TO A READ HEAD PASSING OVER THE DISCRETE MAGNETIC ELEMENTS, EACH OF THE SAMPLES CORRESPONDING TO ONE OF THE MAGNETIC ELEMENTS OF THE NULL PATTERN
212
GENERATE A DEMODULATED POSITION SIGNAL CORRESPONDING TO THE POSITION OF THE HEAD RELATIVE TO THE ROW OF NON-MAGNETIC MATERIAL OF THE TRACK BASED ON THE READBACK SIGNAL SAMPLES
214

FIG. 9

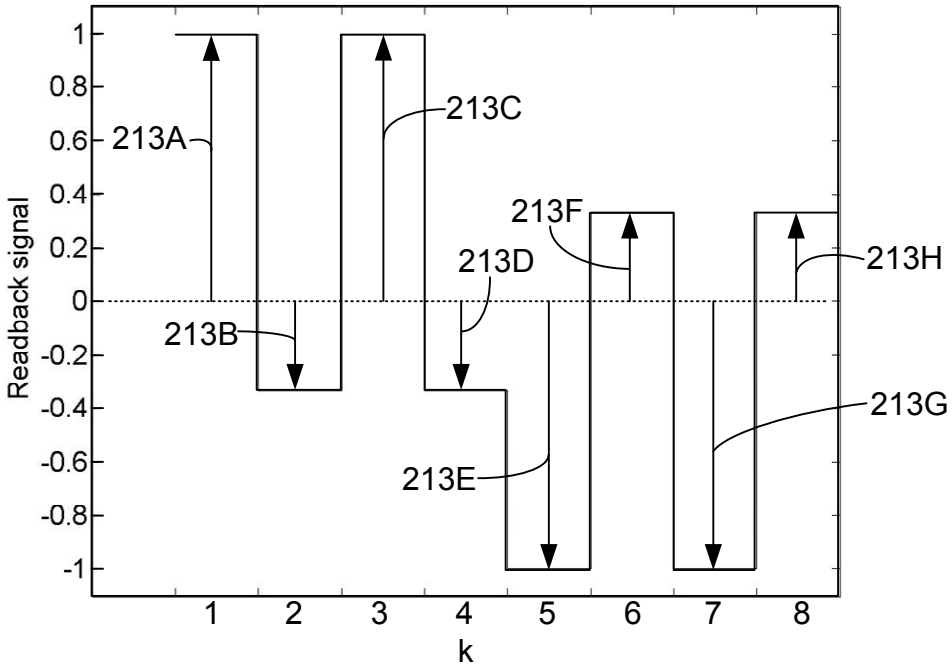

Readback signal
k
213A
213B
213C
213D
213E
213F
213G
213H
1
0.8
0.6
0.4
0.2
0
-0.2
-0.4
-0.6
-0.8
-1
1
2
3
4
5
6
7
8

FIG. 10

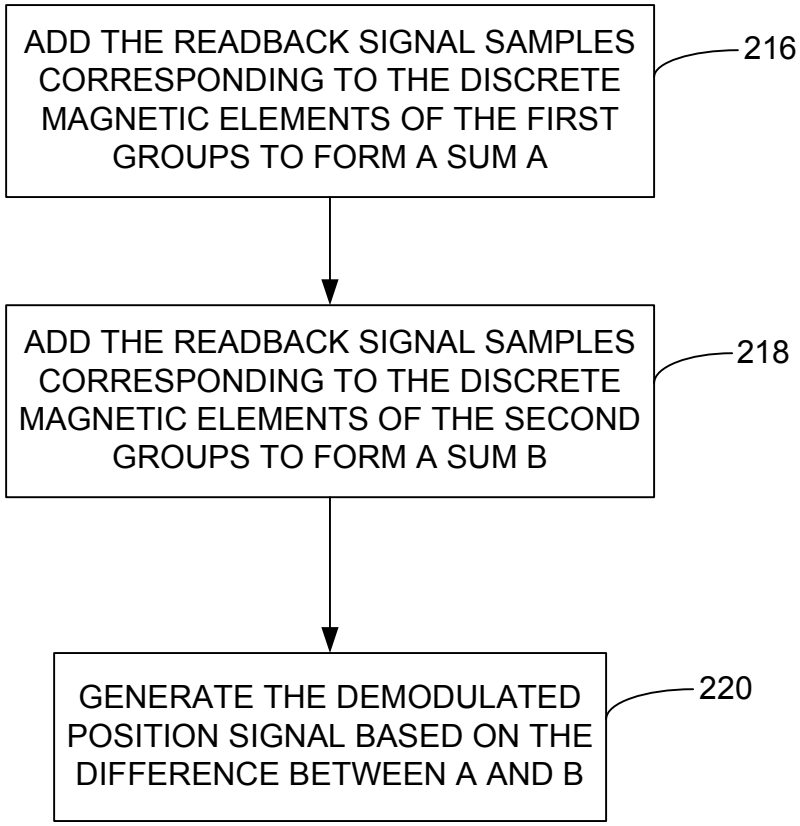

ADD THE READBACK SIGNAL SAMPLES CORRESPONDING TO THE DISCRETE MAGNETIC ELEMENTS OF THE FIRST GROUPS TO FORM A SUM A
216
ADD THE READBACK SIGNAL SAMPLES CORRESPONDING TO THE DISCRETE MAGNETIC ELEMENTS OF THE SECOND GROUPS TO FORM A SUM B
218
GENERATE THE DEMODULATED POSITION SIGNAL BASED ON THE DIFFERENCE BETWEEN A AND B
220

FIG. 11

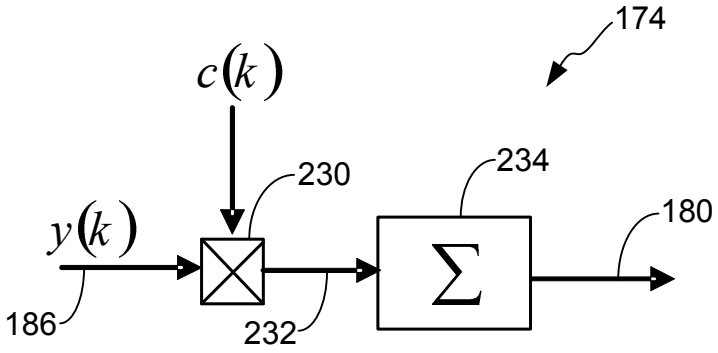


FIG. 12

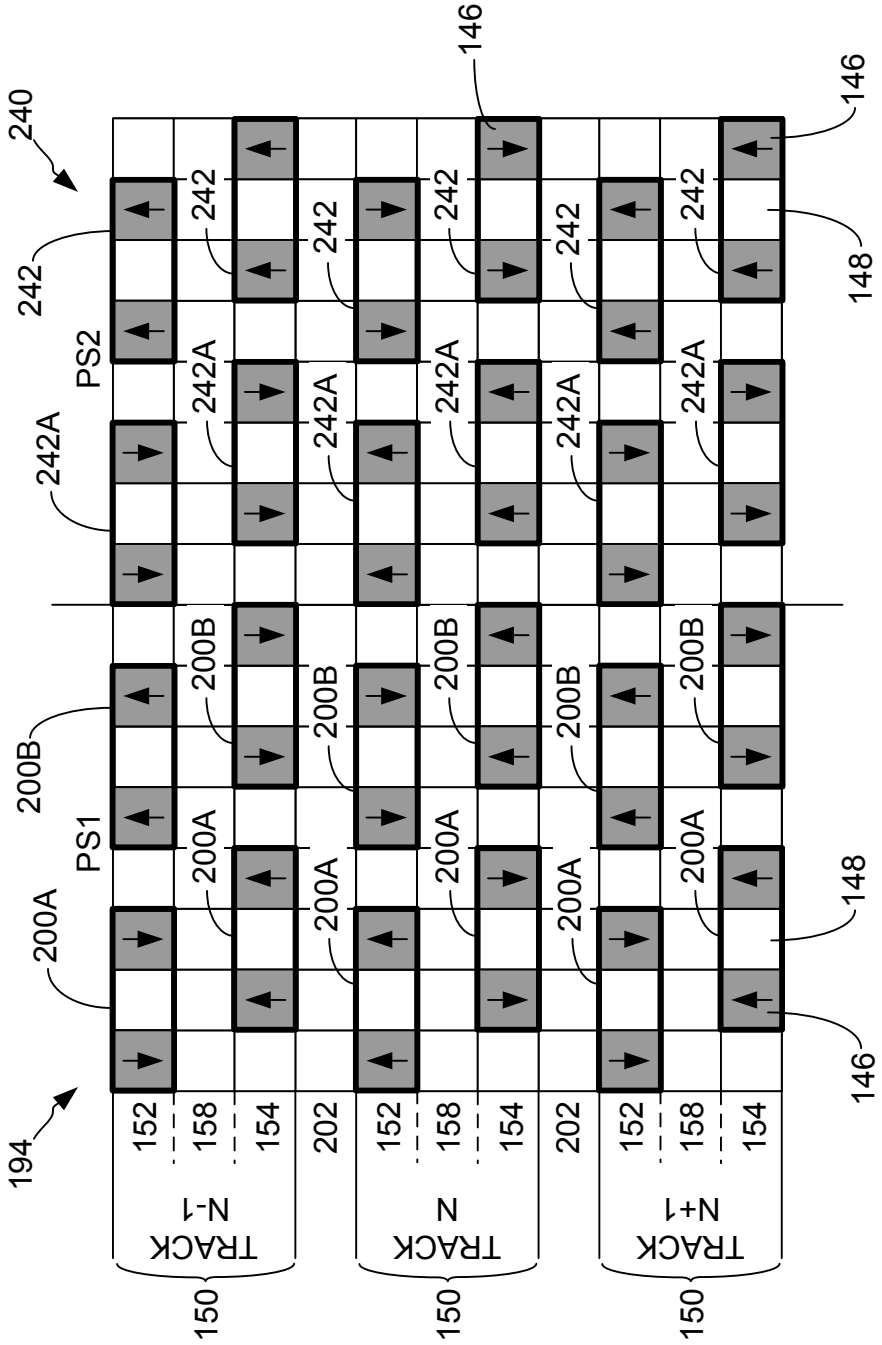

240
242
242A
PS2
200B
PS1
200A
194
152
158
154
202
TRACK N-1
TRACK N
TRACK N+1
150
146
148

FIG. 13

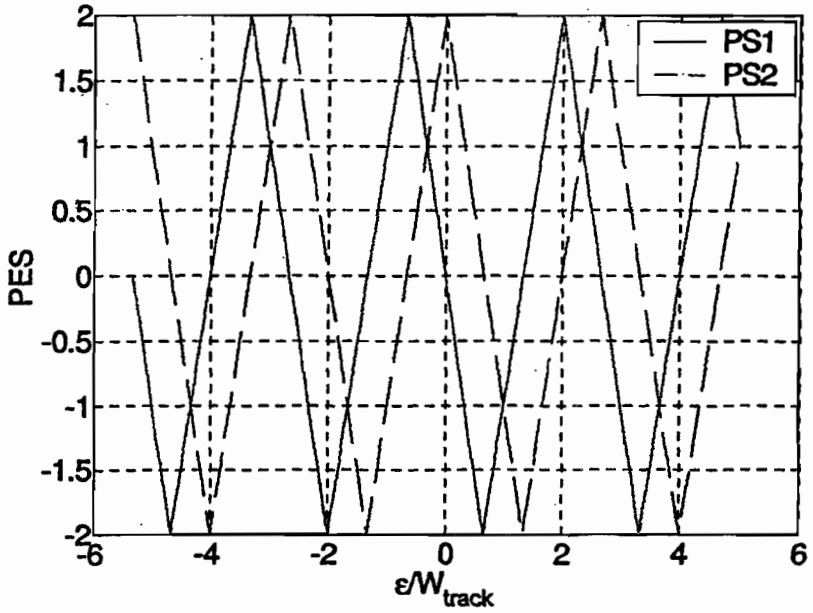


FIG. 14

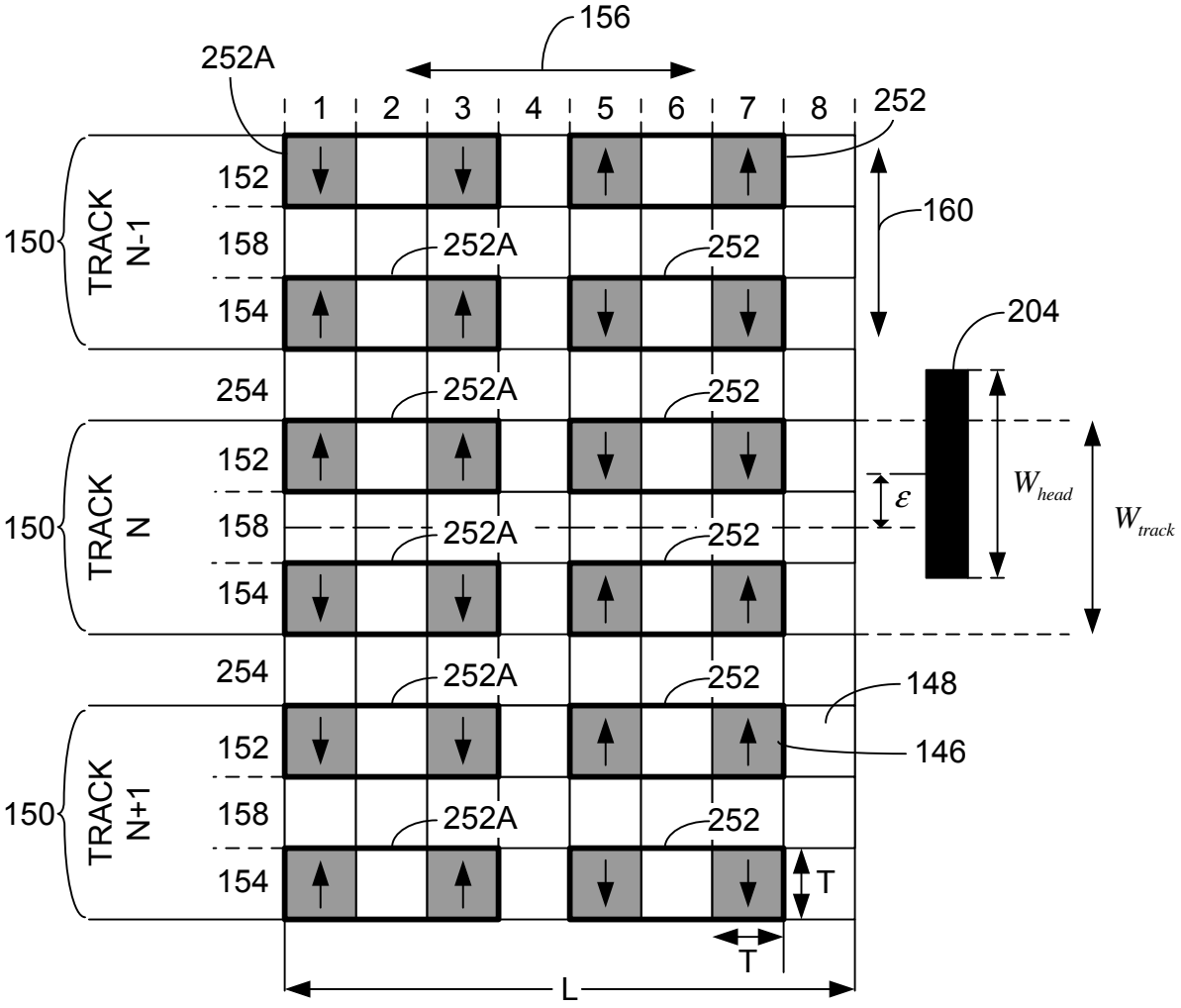

156
252A
1
2
3
4
5
6
7
8
252
152
158
154
150
TRACK N-1
TRACK N
TRACK N+1
160
204
254
W_{head}
W_{track}
ε
148
146
T
L

FIG. 15

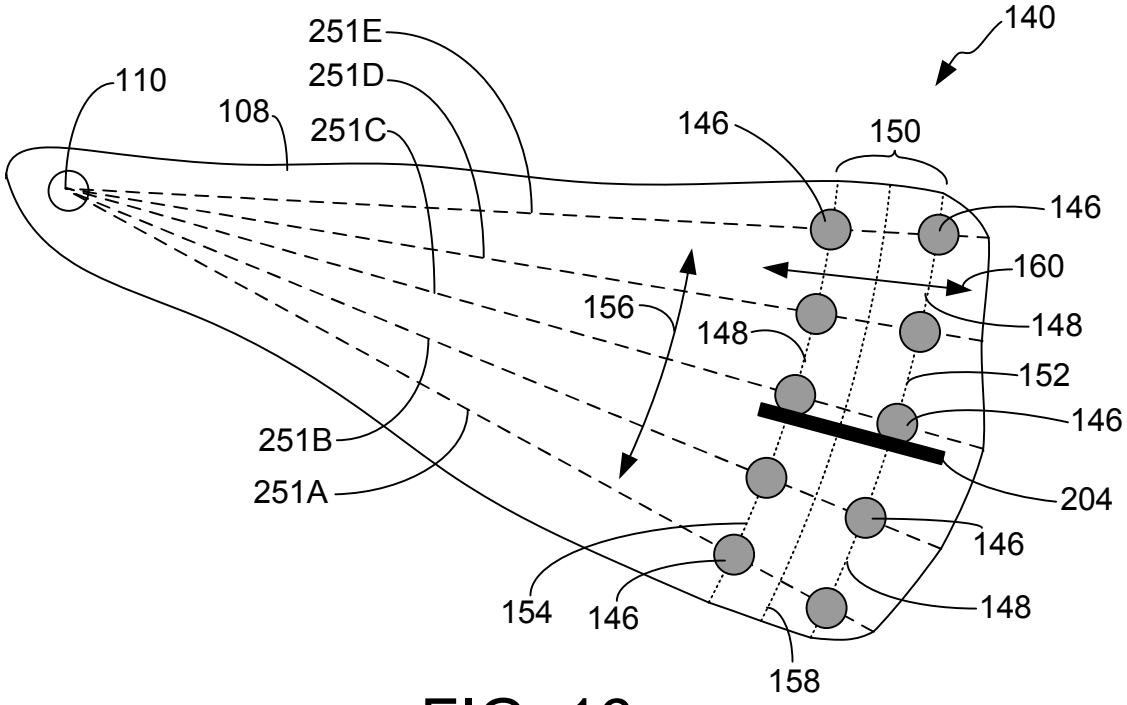

140
251E
251D
251C
110
108
146
150
146
160
156
148
148
152
146
251B
251A
204
146
154
146
148
158

FIG. 16

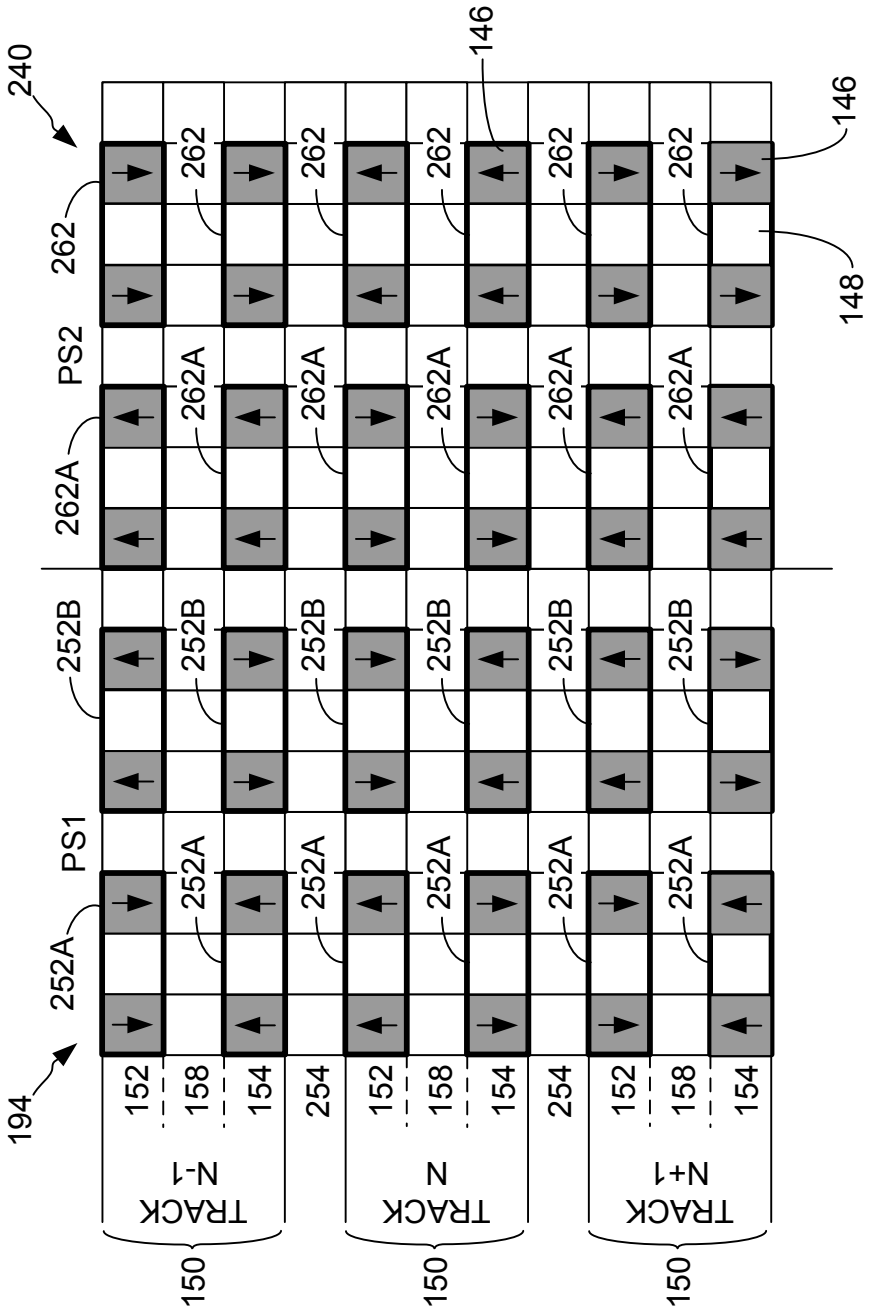

240
194
146
148
262
262A
PS2
PS1
252A
252B
262
262A
252A
252B
152
158
154
254
TRACK N-1
TRACK N
TRACK N+1
150

FIG. 17