PRIOR ART

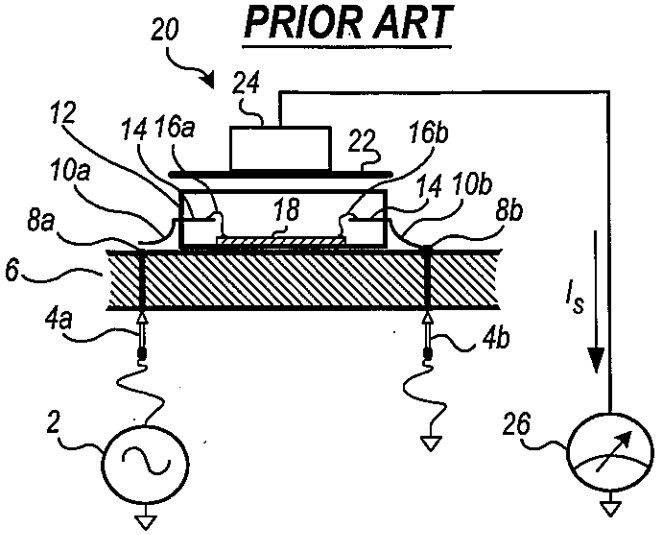
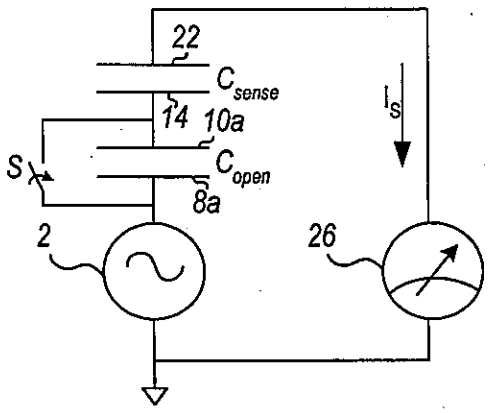


FIG. 1A

PRIOR ART



S closed: Good Connection
S open: Open Connection

FIG. 1B

PRIOR ART

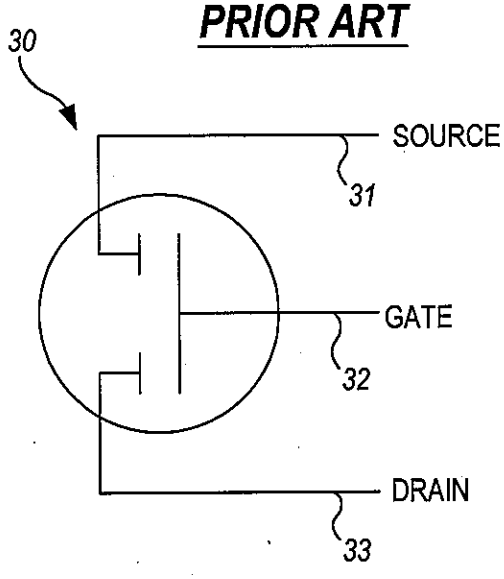


FIG. 2A

PRIOR ART

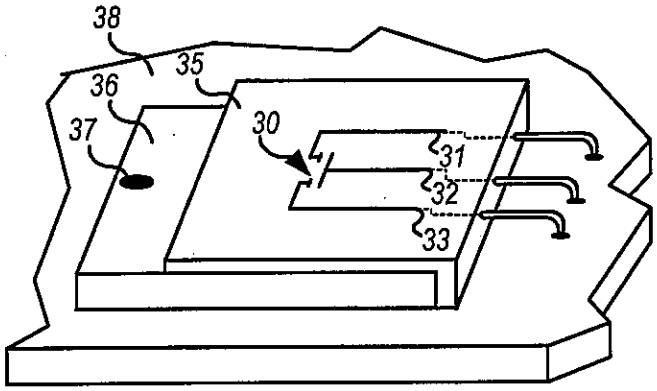


FIG. 2B

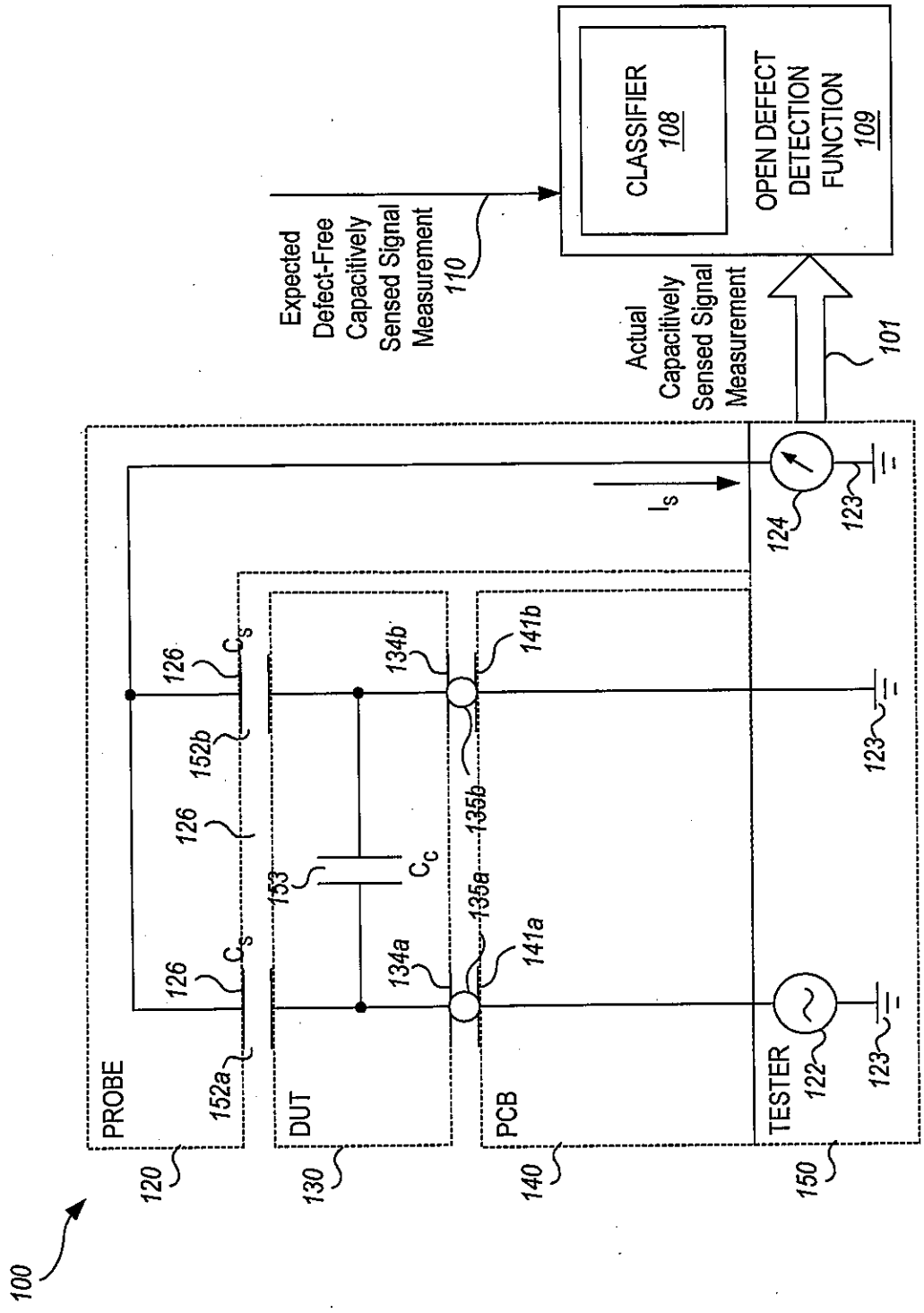

100
PROBE
120
152a
126
C_s
152b
126
C_s
126
DUT
130
153
C_c
134a
134b
135a
135b
PCB
140
141a
141b
TESTER
150
122
123
123
123
124
I_s
Actual Capacitively Sensed Signal Measurement
101
Expected Defect-Free Capacitively Sensed Signal Measurement
110
CLASSIFIER
108
OPEN DEFECT DETECTION FUNCTION
109

FIG. 3

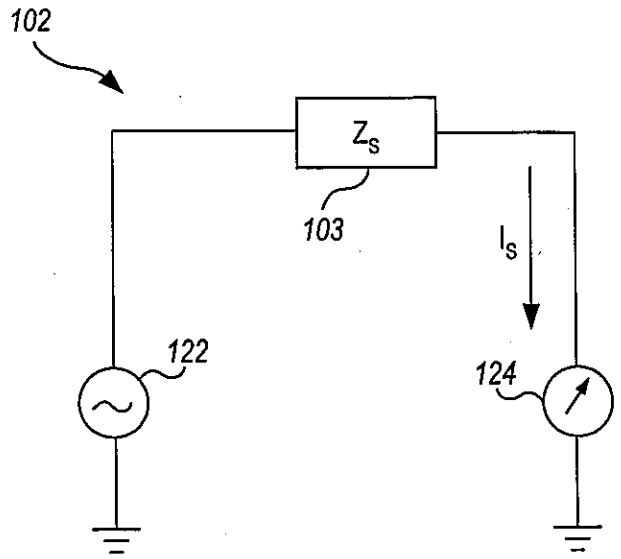

102
Z_S
103
I_S
122
124

FIG. 4

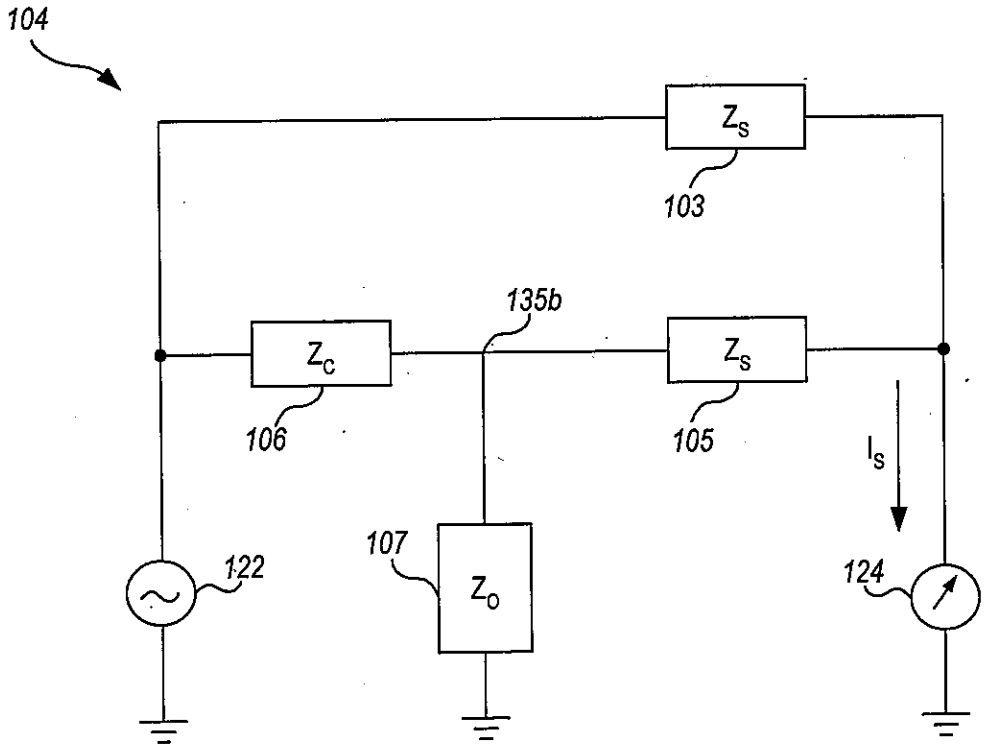

104
Z_S
103
135b
Z_C
106
Z_S
105
I_S
122
107
Z_O
124

FIG. 5

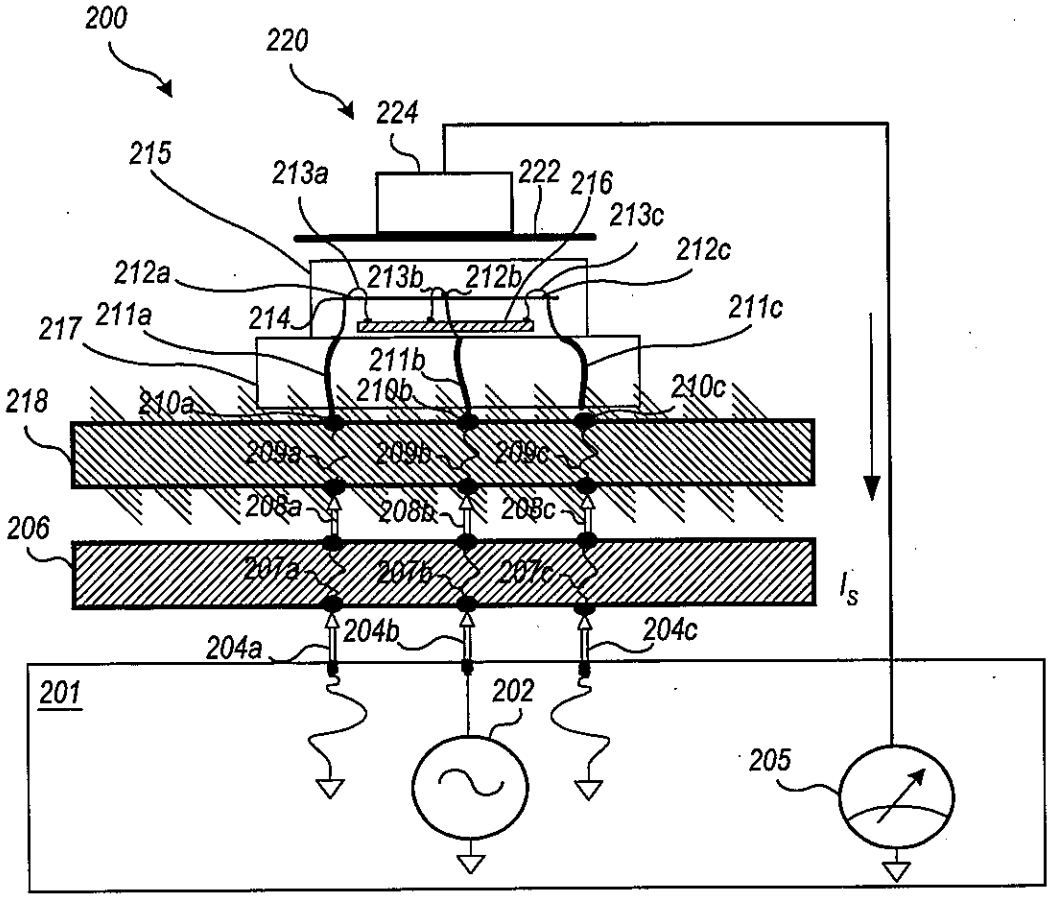

200
220
224
215
213a
222
216
213c
212c
212a
213b
212b
214
211c
217
211a
211b
210b
210c
218
210a
209a
209b
209c
208a
208b
208c
206
207a
207b
207c
I_S
204a
204b
204c
201
202
205

FIG. 6A

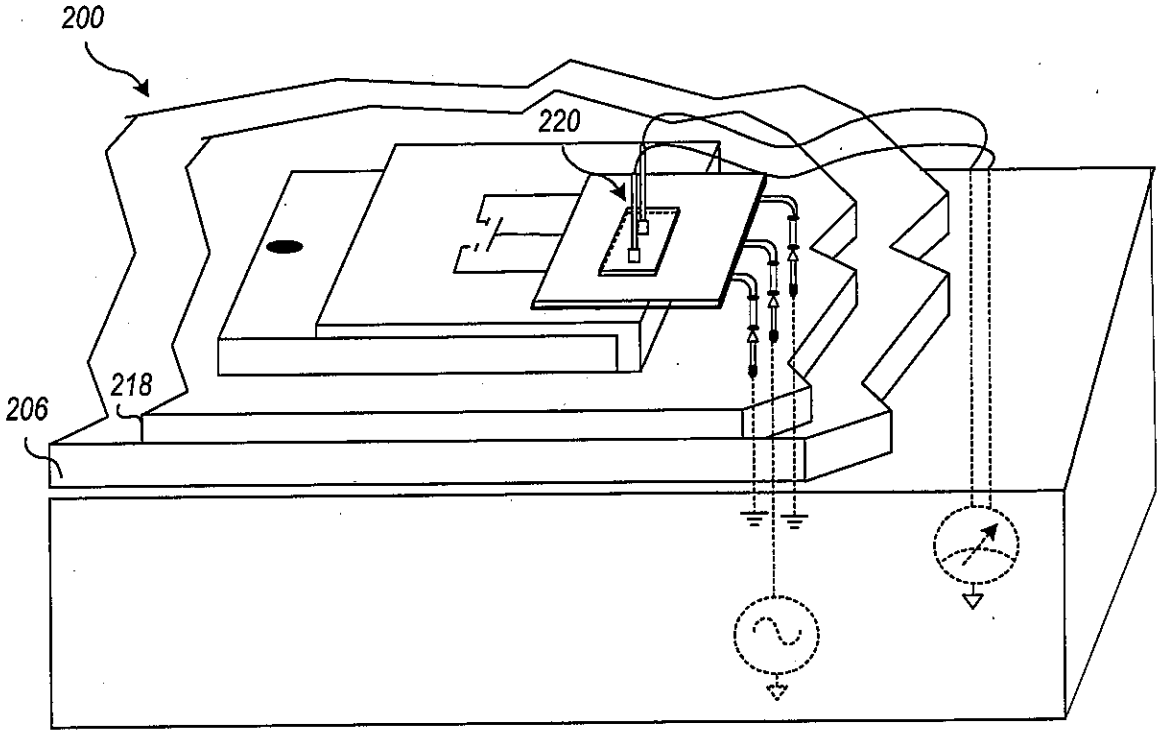

200
220
218
206

FIG. 6B

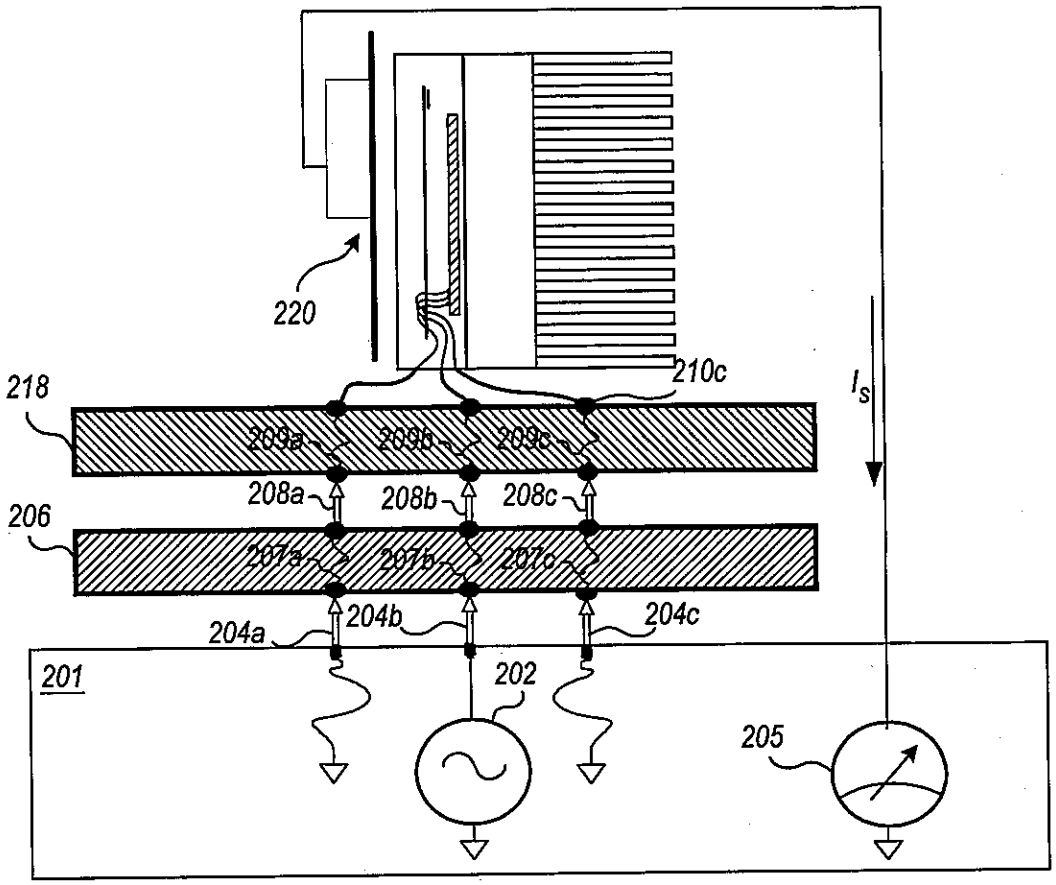

220
218
210c
I_s
209a
209b
209c
208a
208b
208c
206
207a
207b
207c
204a
204b
204c
201
202
205

FIG. 7A

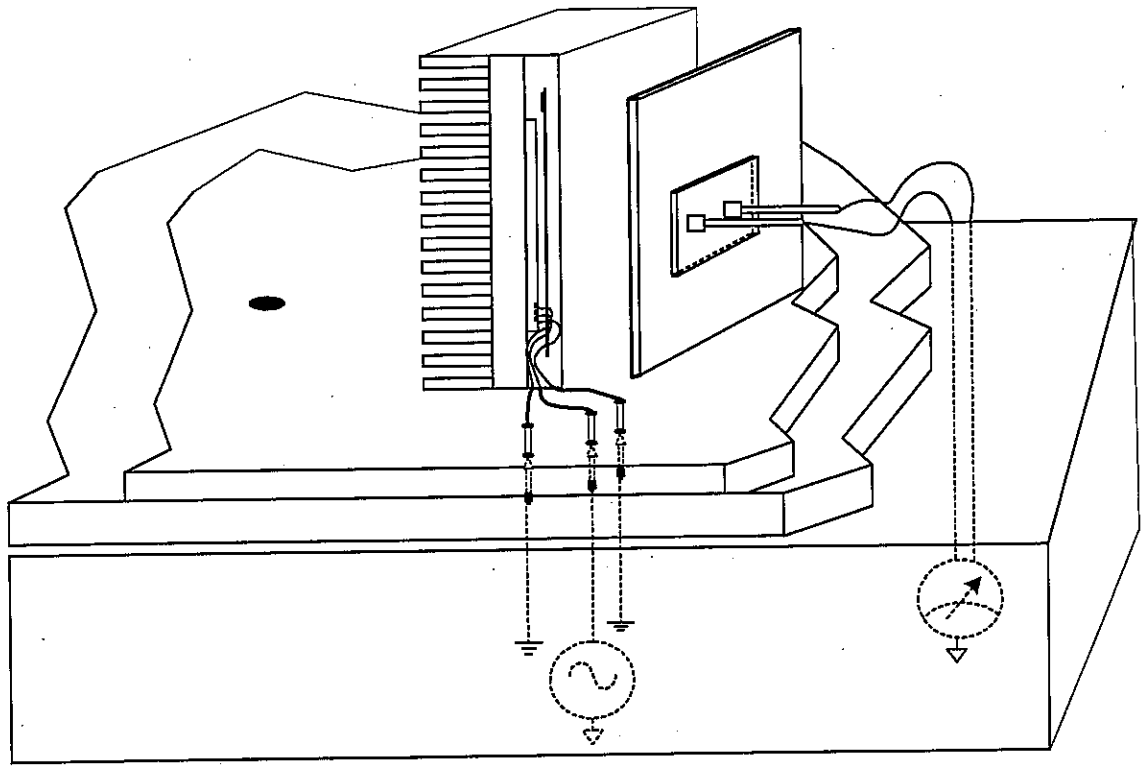


FIG. 7B

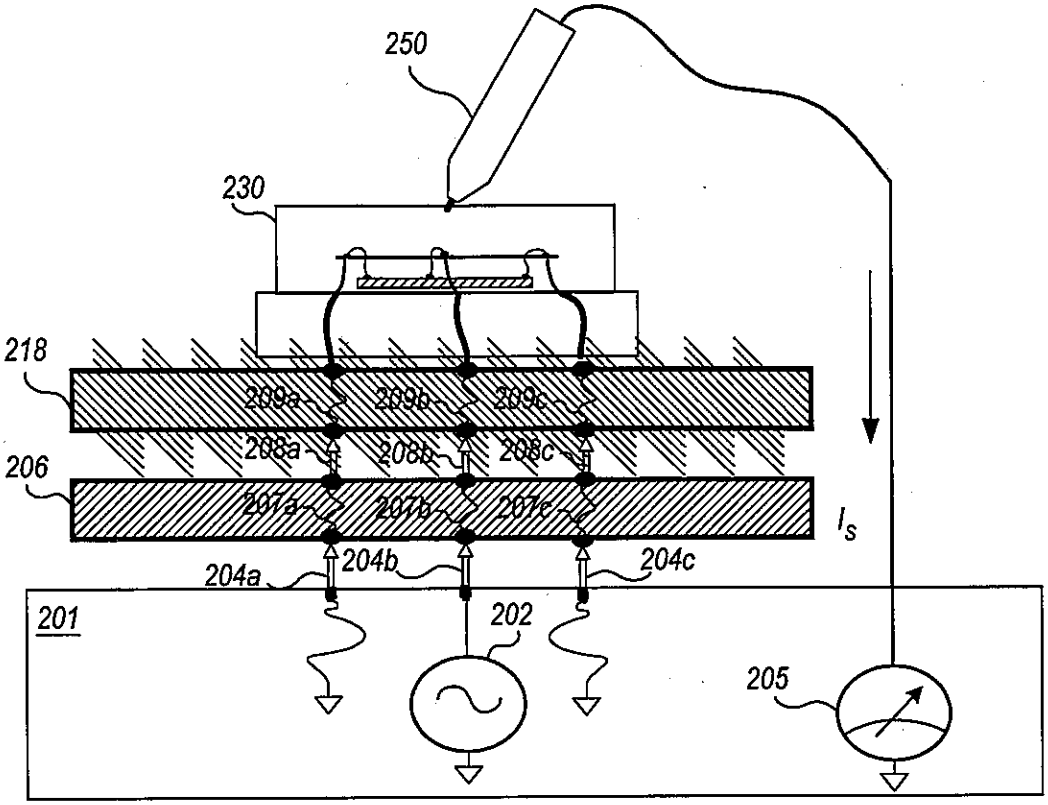

250
230
218
209a
209b
209c
208a
208b
208c
206
207a
207b
207c
I_s
204a
204b
204c
201
202
205

FIG. 8A

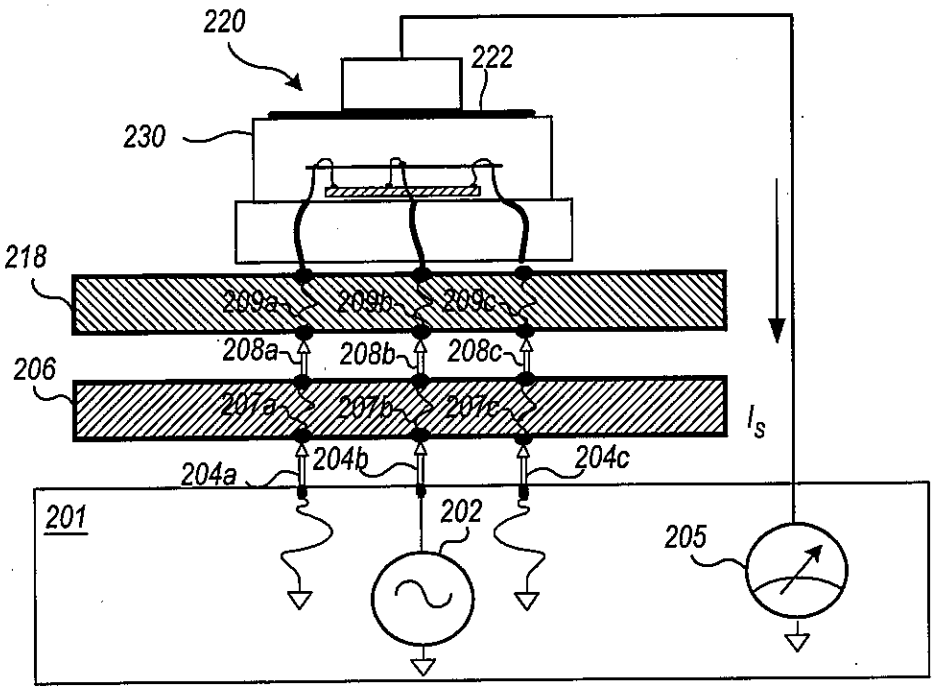

220
222
230
218
209a
209b
209c
208a
208b
208c
206
207a
207b
207c
I_s
204a
204b
204c
201
202
205

FIG. 8B

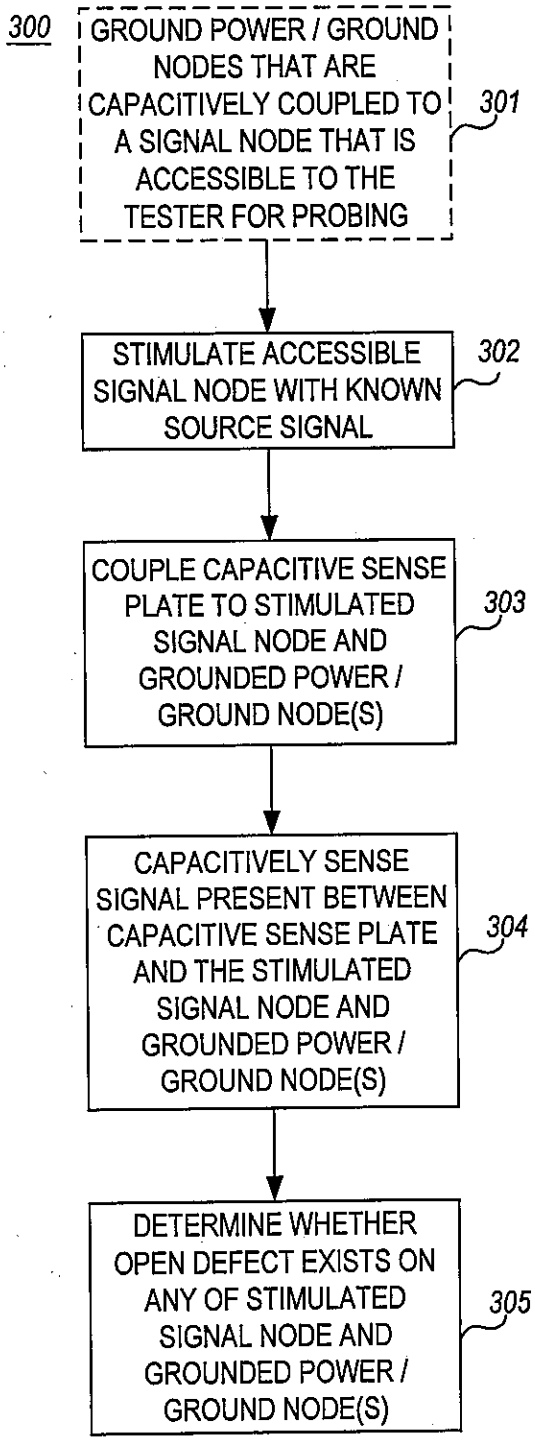

300
GROUND POWER / GROUND NODES THAT ARE CAPACITIVELY COUPLED TO A SIGNAL NODE THAT IS ACCESSIBLE TO THE TESTER FOR PROBING
301
STIMULATE ACCESSIBLE SIGNAL NODE WITH KNOWN SOURCE SIGNAL
302
COUPLE CAPACITIVE SENSE PLATE TO STIMULATED SIGNAL NODE AND GROUNDED POWER / GROUND NODE(S)
303
CAPACITIVELY SENSE SIGNAL PRESENT BETWEEN CAPACITIVE SENSE PLATE AND THE STIMULATED SIGNAL NODE AND GROUNDED POWER / GROUND NODE(S)
304
DETERMINE WHETHER OPEN DEFECT EXISTS ON ANY OF STIMULATED SIGNAL NODE AND GROUNDED POWER / GROUND NODE(S)
305

FIG. 9A

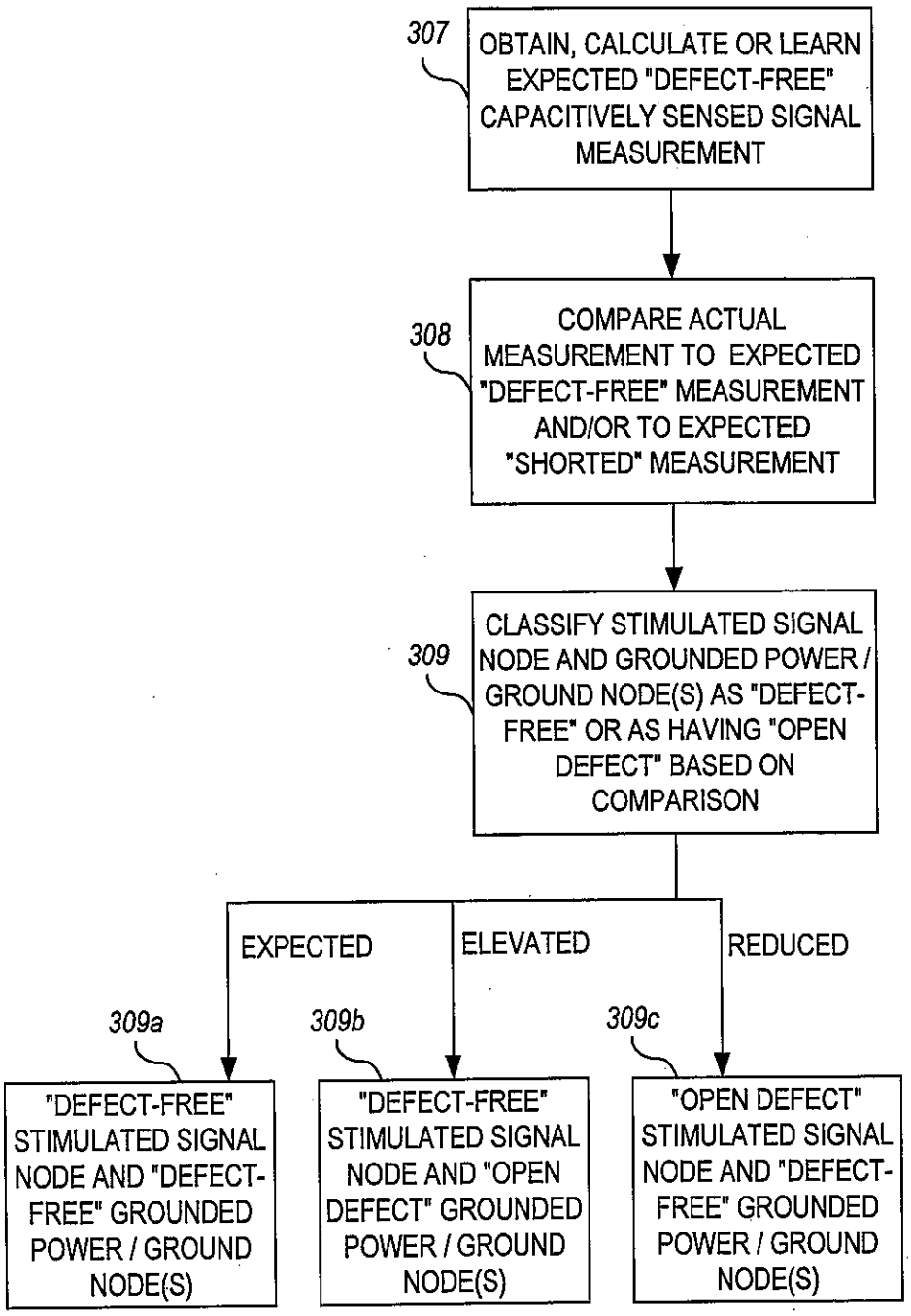

307
OBTAIN, CALCULATE OR LEARN EXPECTED "DEFECT-FREE" CAPACITIVELY SENSED SIGNAL MEASUREMENT
308
COMPARE ACTUAL MEASUREMENT TO EXPECTED "DEFECT-FREE" MEASUREMENT AND/OR TO EXPECTED "SHORTED" MEASUREMENT
309
CLASSIFY STIMULATED SIGNAL NODE AND GROUNDED POWER / GROUND NODE(S) AS "DEFECT-FREE" OR AS HAVING "OPEN DEFECT" BASED ON COMPARISON
EXPECTED
ELEVATED
REDUCED
309a
309b
309c
"DEFECT-FREE" STIMULATED SIGNAL NODE AND "DEFECT-FREE" GROUNDED POWER / GROUND NODE(S)
"DEFECT-FREE" STIMULATED SIGNAL NODE AND "OPEN DEFECT" GROUNDED POWER / GROUND NODE(S)
"OPEN DEFECT" STIMULATED SIGNAL NODE AND "DEFECT-FREE" GROUNDED POWER / GROUND NODE(S)

FIG. 9B

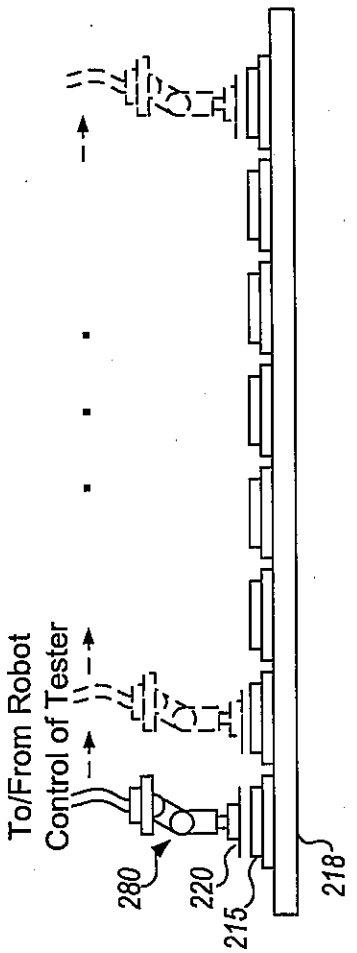


FIG. 10A

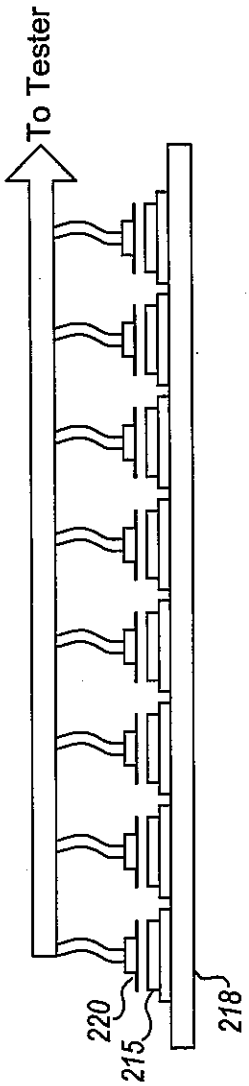


FIG. 10B