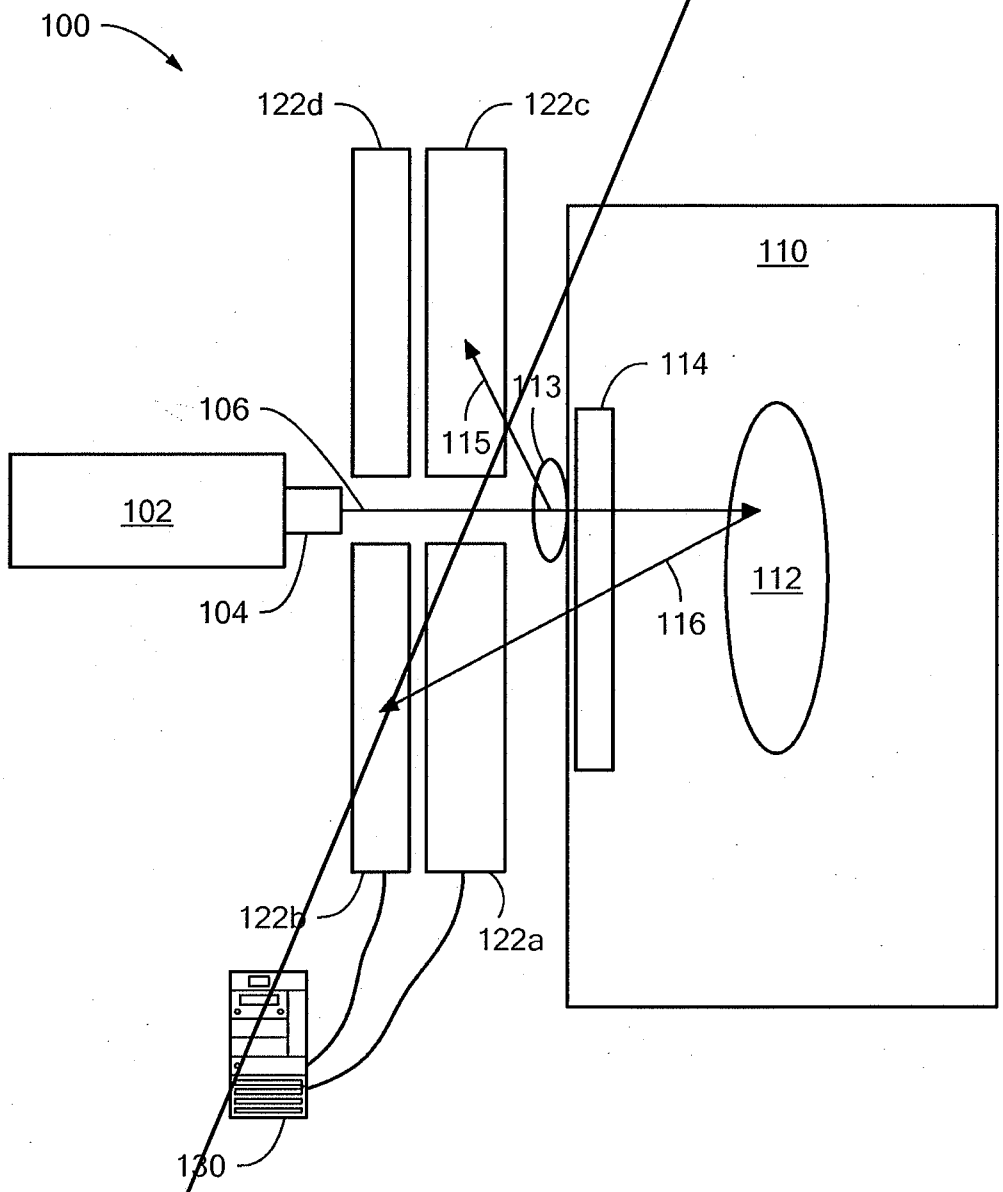


FIG. 1

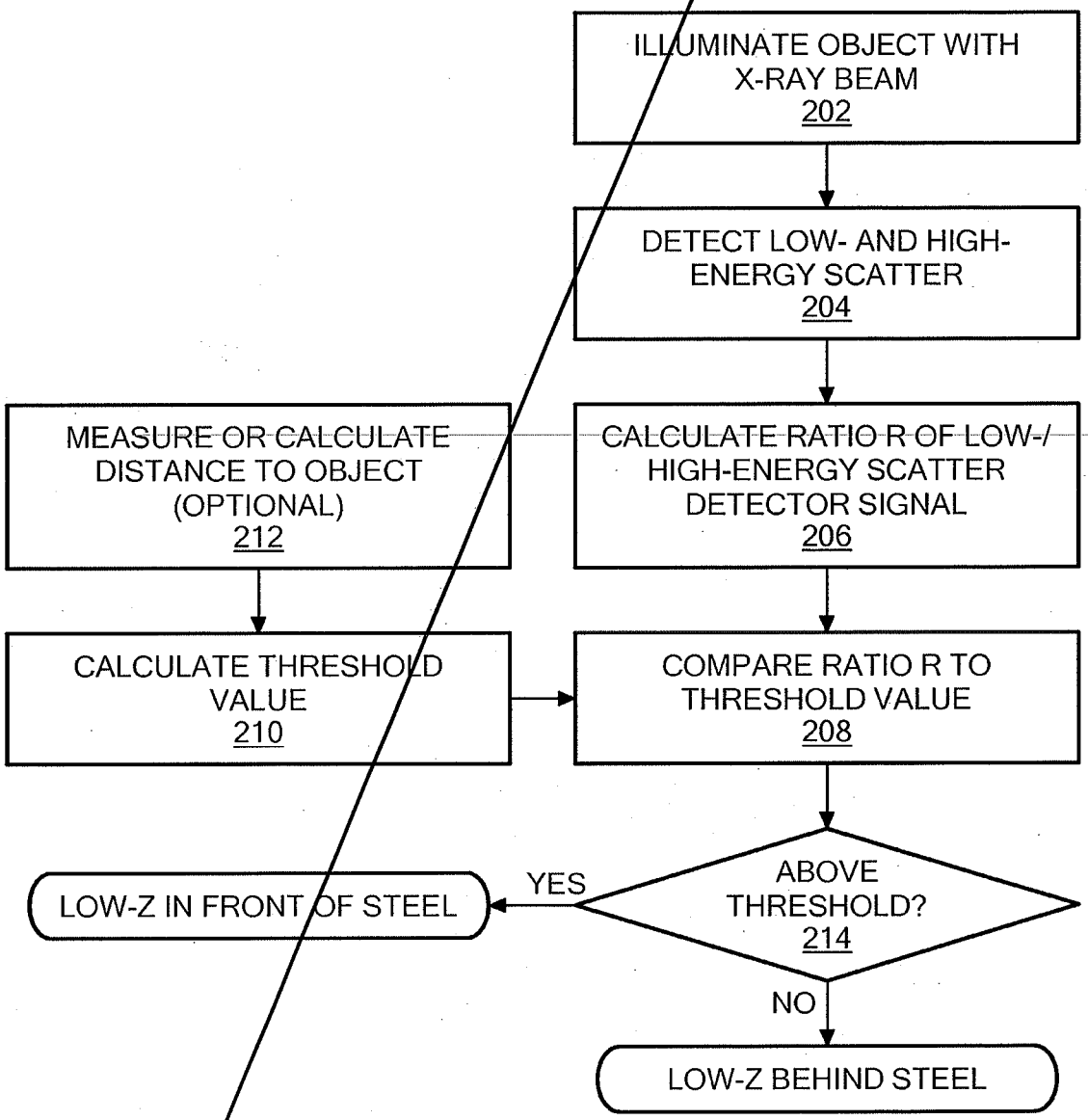

ILLUMINATE OBJECT WITH X-RAY BEAM 202
DETECT LOW- AND HIGH-ENERGY SCATTER 204
MEASURE OR CALCULATE DISTANCE TO OBJECT (OPTIONAL) 212
CALCULATE RATIO R OF LOW-/HIGH-ENERGY SCATTER DETECTOR SIGNAL 206
CALCULATE THRESHOLD VALUE 210
COMPARE RATIO R TO THRESHOLD VALUE 208
ABOVE THRESHOLD? 214
YES
LOW-Z IN FRONT OF STEEL
NO
LOW-Z BEHIND STEEL

FIG. 2

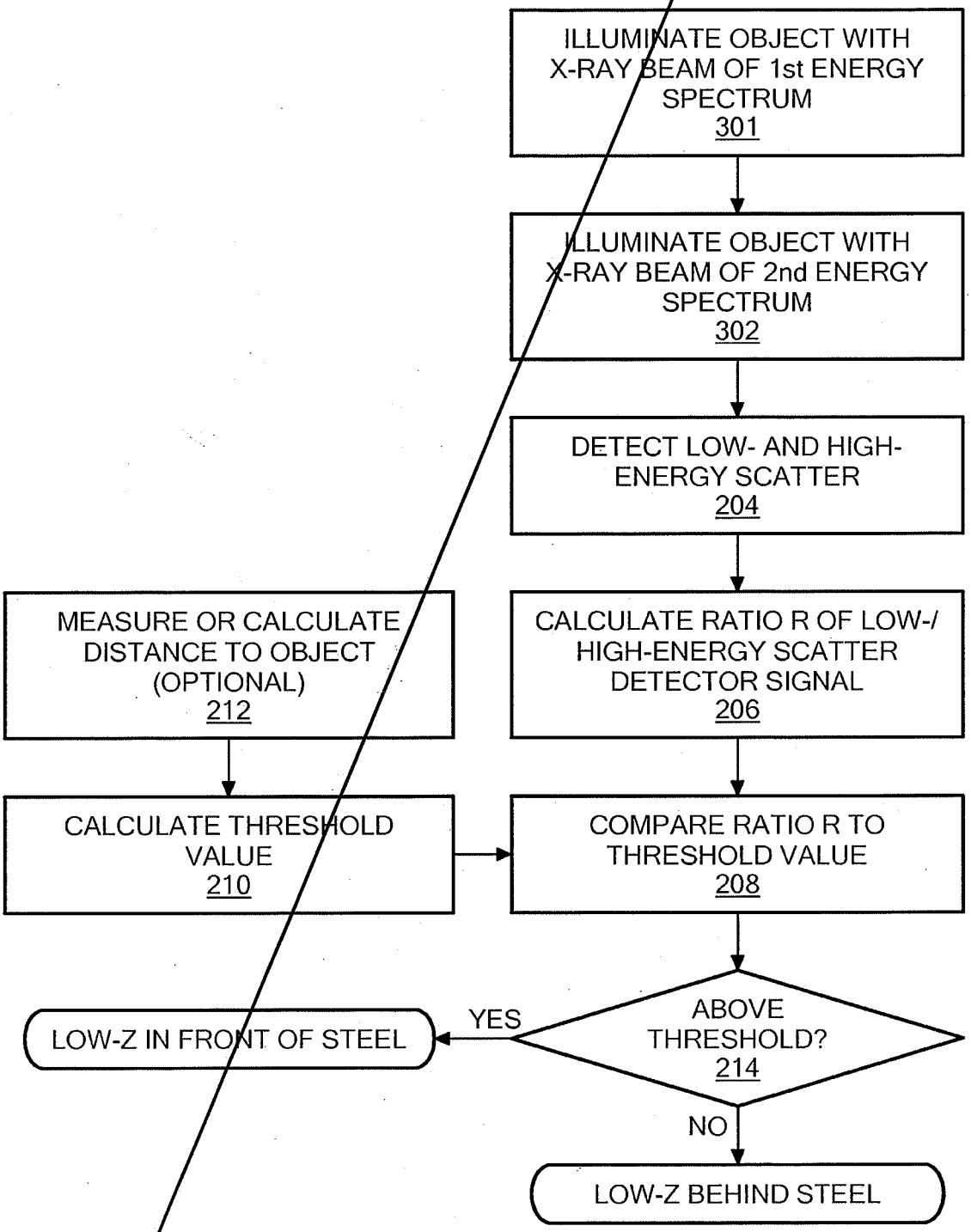

ILLUMINATE OBJECT WITH X-RAY BEAM OF 1st ENERGY SPECTRUM
301
ILLUMINATE OBJECT WITH X-RAY BEAM OF 2nd ENERGY SPECTRUM
302
DETECT LOW- AND HIGH-ENERGY SCATTER
204
MEASURE OR CALCULATE DISTANCE TO OBJECT (OPTIONAL)
212
CALCULATE RATIO R OF LOW-/HIGH-ENERGY SCATTER DETECTOR SIGNAL
206
CALCULATE THRESHOLD VALUE
210
COMPARE RATIO R TO THRESHOLD VALUE
208
ABOVE THRESHOLD?
214
YES
LOW-Z IN FRONT OF STEEL
NO
LOW-Z BEHIND STEEL

FIG. 3

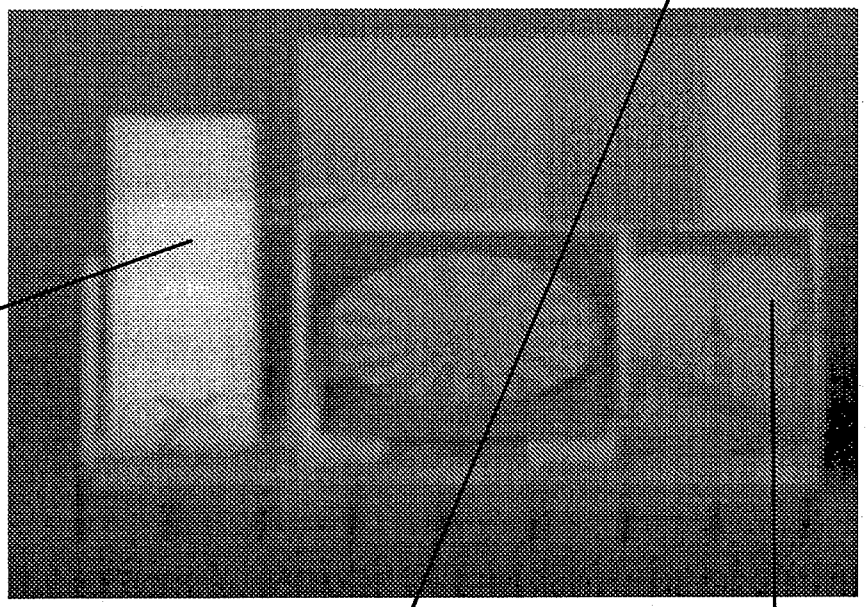


FIG. 4A

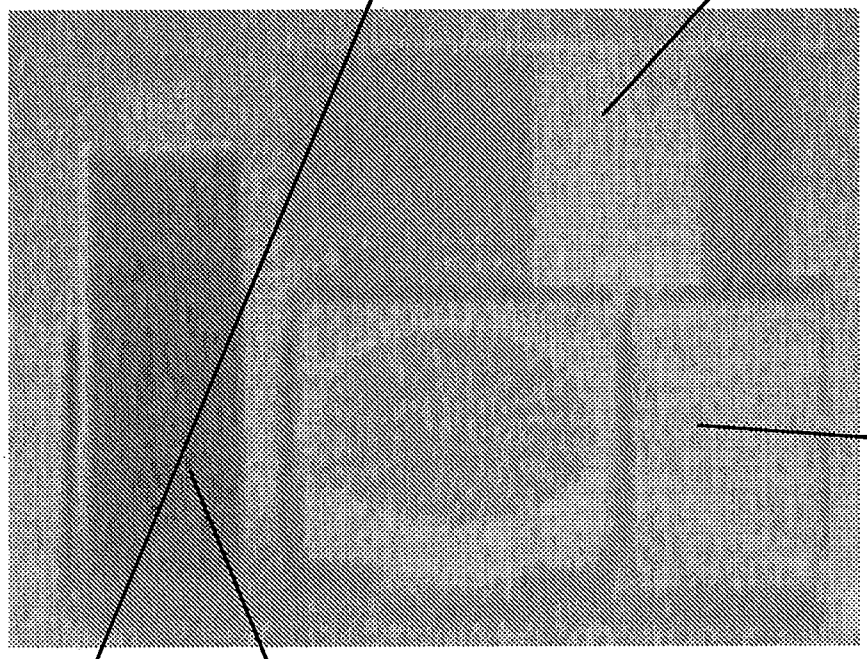


FIG. 4B

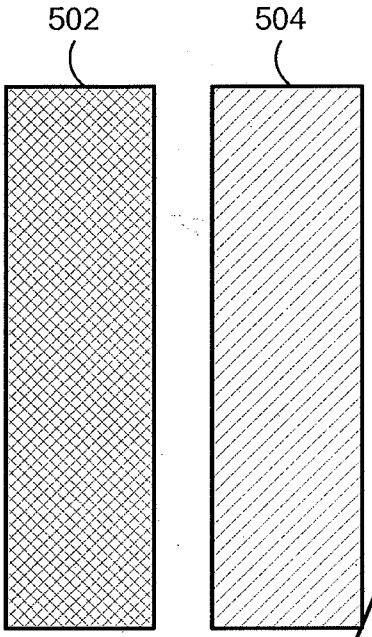


FIG. 5A

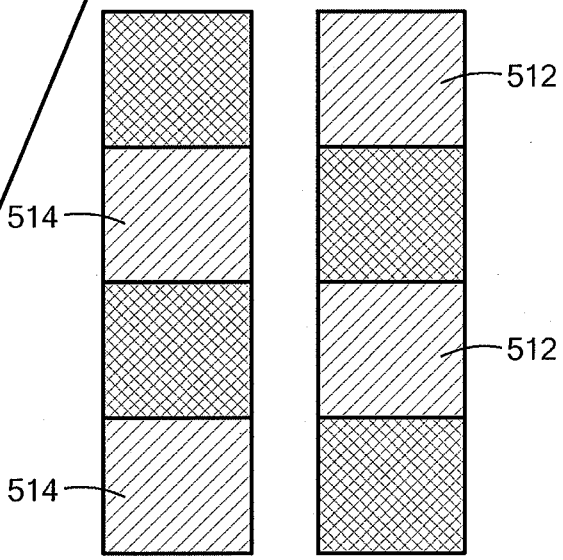


FIG. 5B

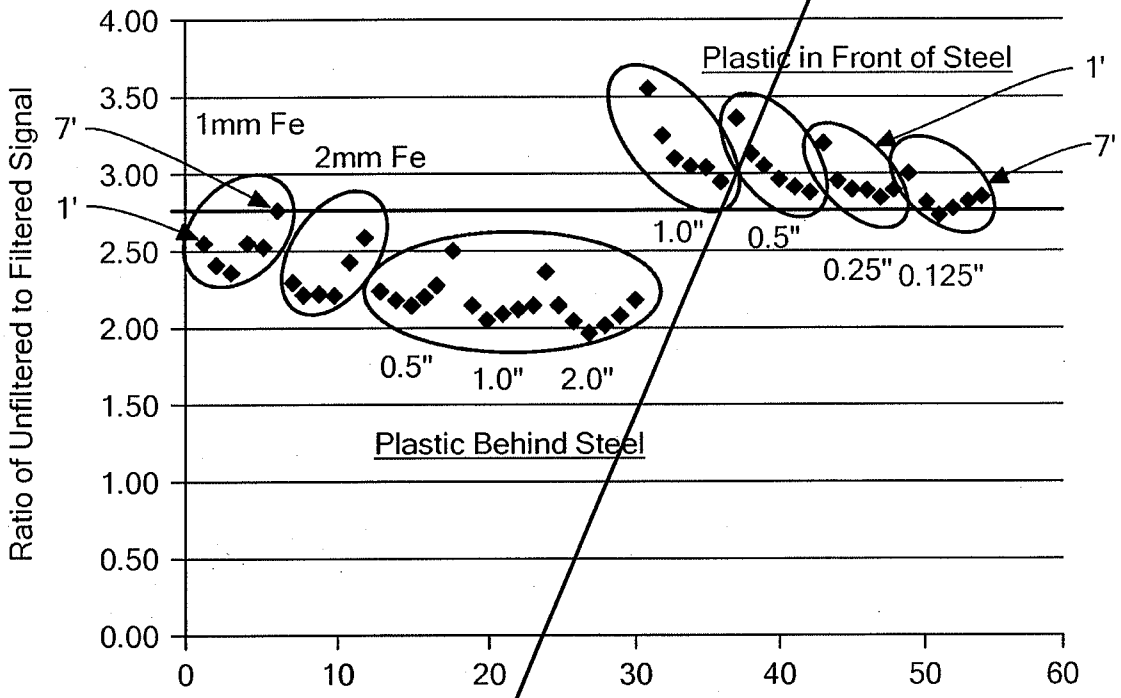

Ratio of Unfiltered to Filtered Signal
4.00
3.50
3.00
2.50
2.00
1.50
1.00
0.50
0.00
0
10
20
30
40
50
60
1mm Fe
2mm Fe
7'
1'
0.5"
1.0"
2.0"
Plastic Behind Steel
Plastic in Front of Steel
1'
7'
1.0"
0.5"
0.25"
0.125"

FIG. 6

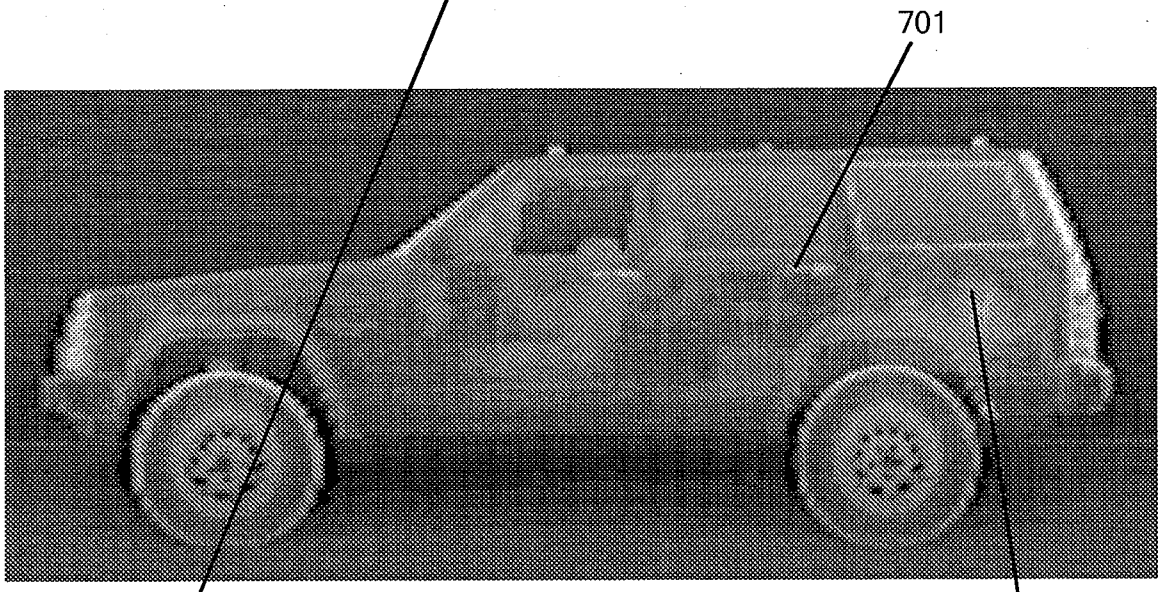

701
703

FIG. 7

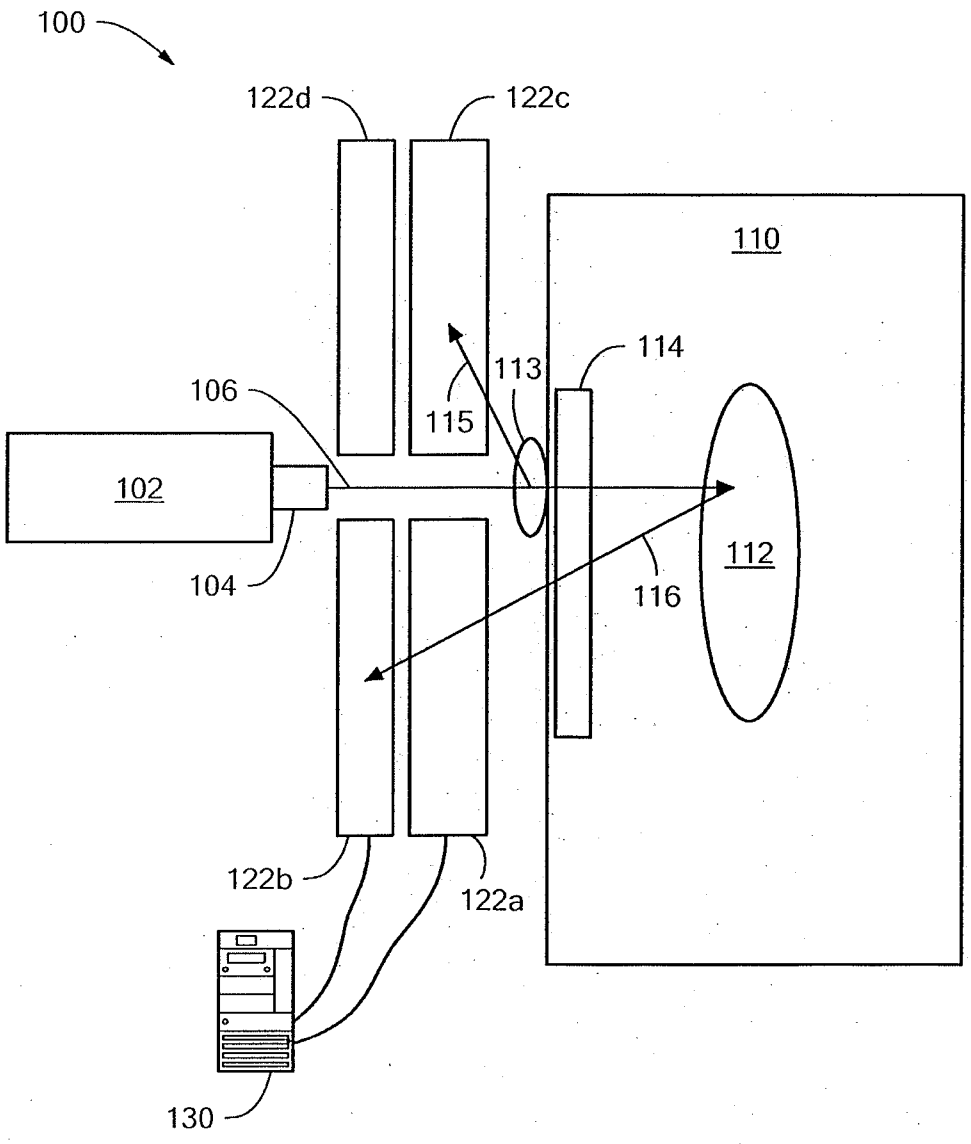


FIG. 1

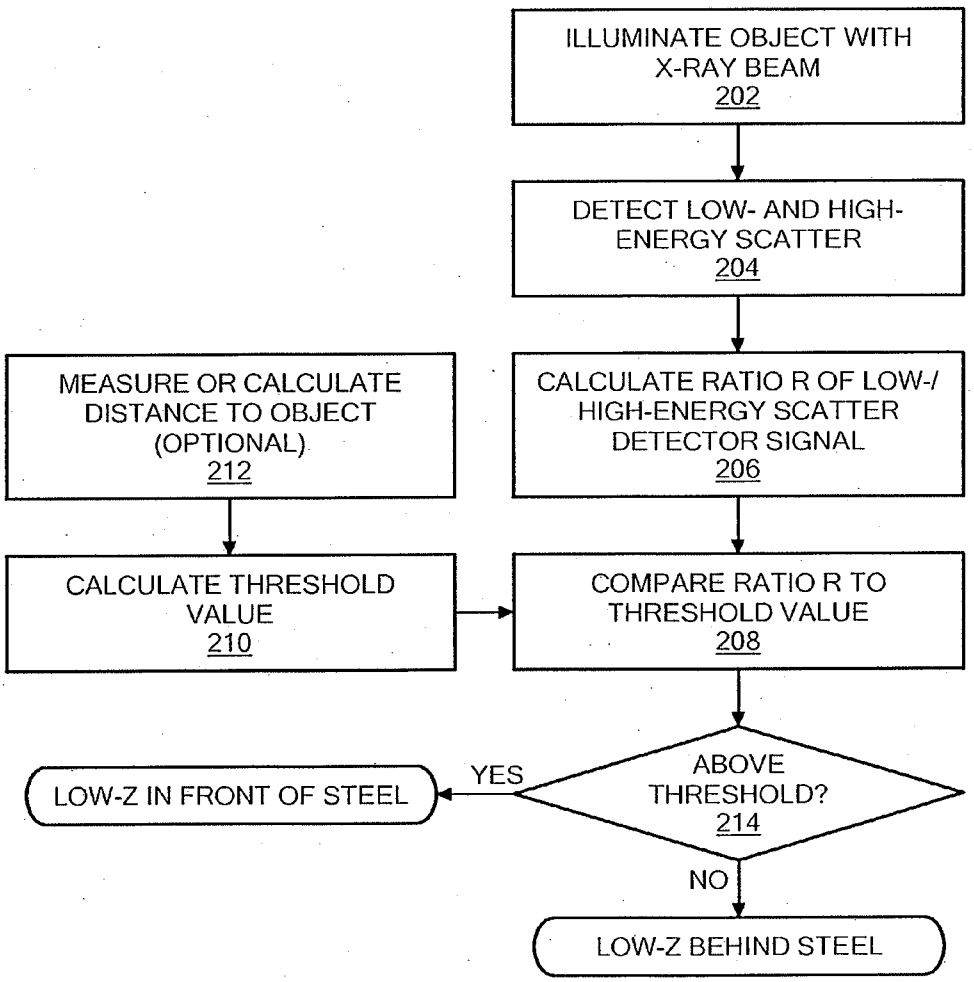

ILLUMINATE OBJECT WITH X-RAY BEAM 202
DETECT LOW- AND HIGH-ENERGY SCATTER 204
CALCULATE RATIO R OF LOW-/HIGH-ENERGY SCATTER DETECTOR SIGNAL 206
COMPARE RATIO R TO THRESHOLD VALUE 208
ABOVE THRESHOLD? 214
YES
LOW-Z IN FRONT OF STEEL
NO
LOW-Z BEHIND STEEL
MEASURE OR CALCULATE DISTANCE TO OBJECT (OPTIONAL) 212
CALCULATE THRESHOLD VALUE 210

FIG. 2

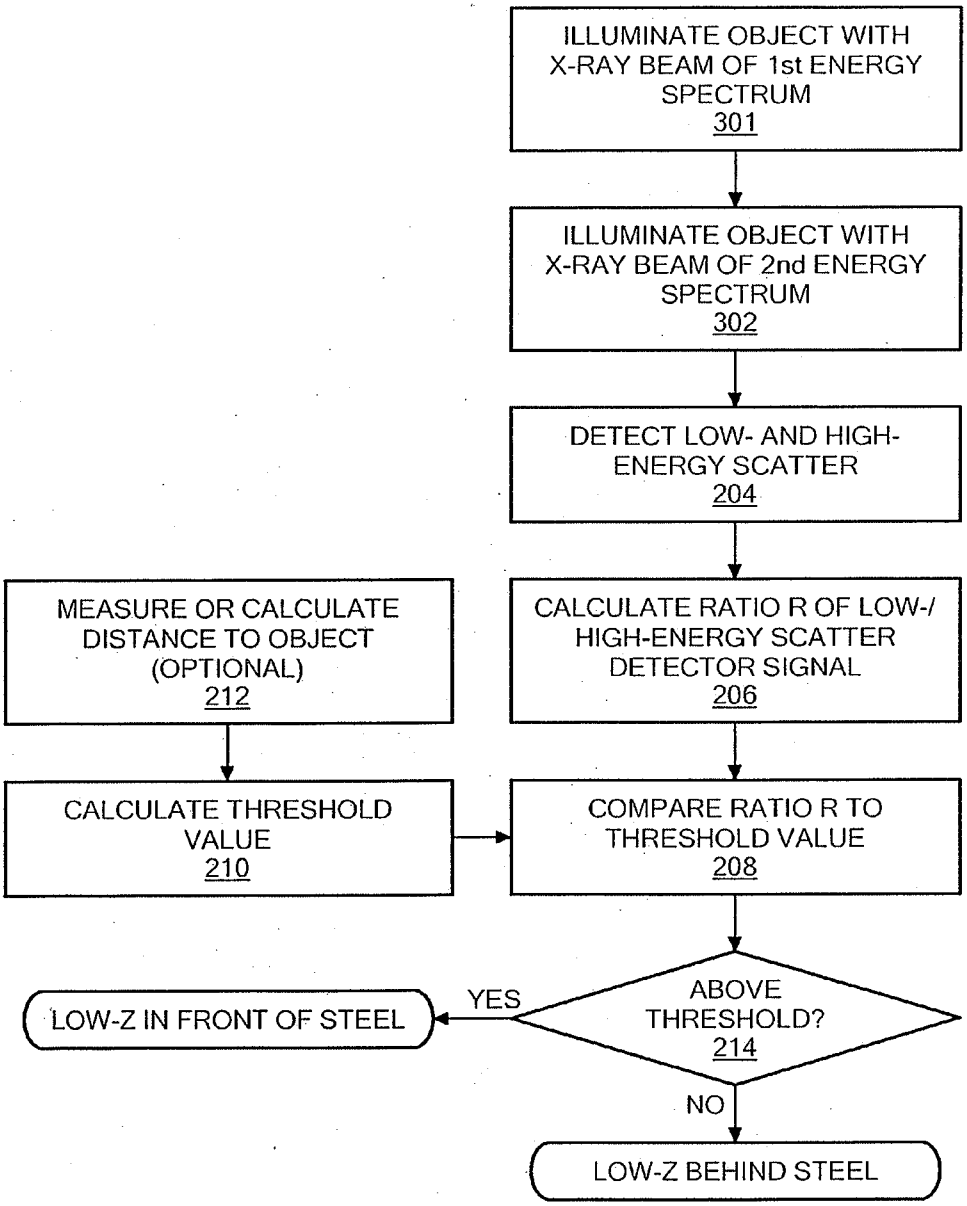

ILLUMINATE OBJECT WITH X-RAY BEAM OF 1st ENERGY SPECTRUM
301
ILLUMINATE OBJECT WITH X-RAY BEAM OF 2nd ENERGY SPECTRUM
302
DETECT LOW- AND HIGH-ENERGY SCATTER
204
CALCULATE RATIO R OF LOW-/HIGH-ENERGY SCATTER DETECTOR SIGNAL
206
MEASURE OR CALCULATE DISTANCE TO OBJECT (OPTIONAL)
212
CALCULATE THRESHOLD VALUE
210
COMPARE RATIO R TO THRESHOLD VALUE
208
ABOVE THRESHOLD?
214
YES
LOW-Z IN FRONT OF STEEL
NO
LOW-Z BEHIND STEEL

FIG. 3

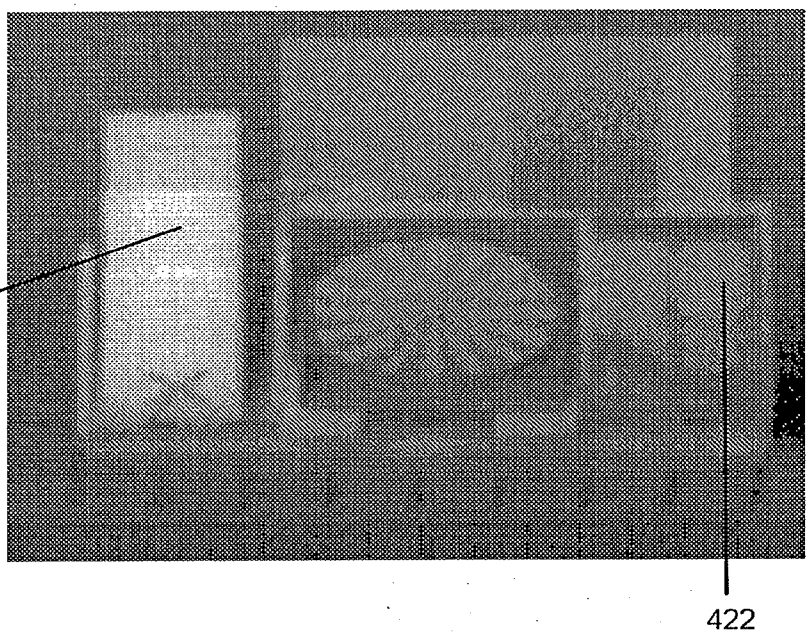


FIG. 4A

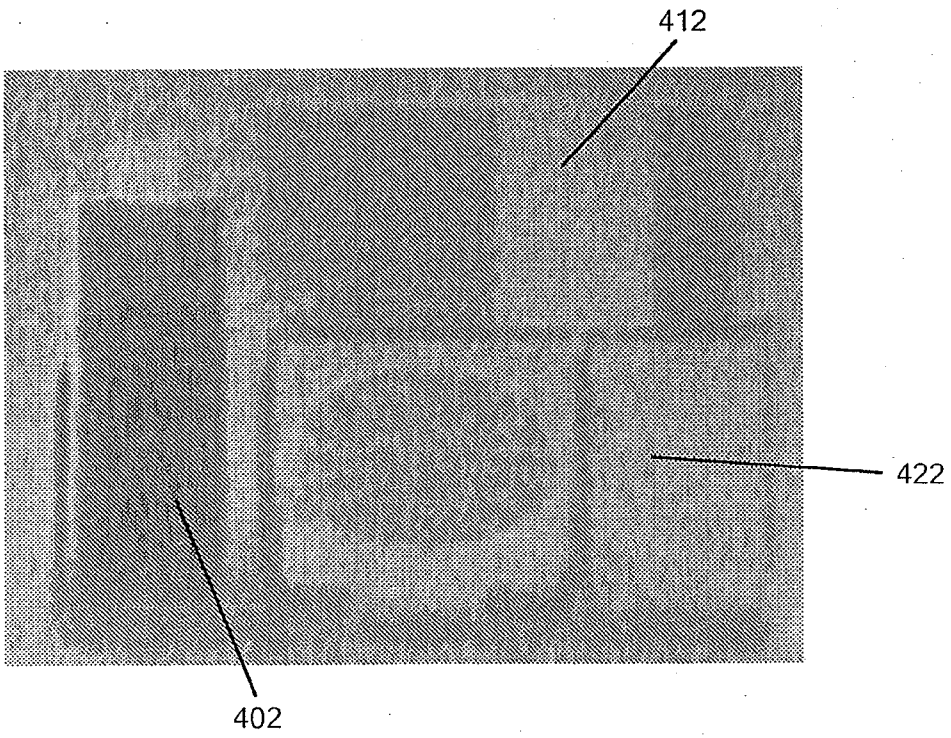


FIG. 4B

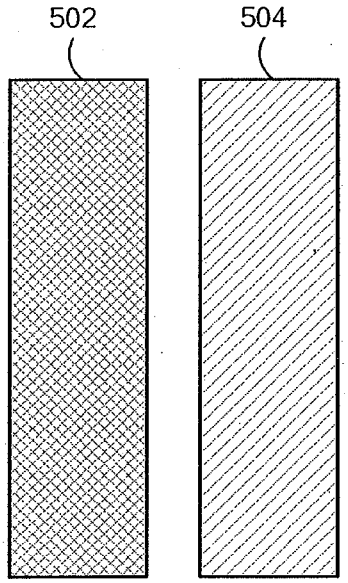


FIG. 5A

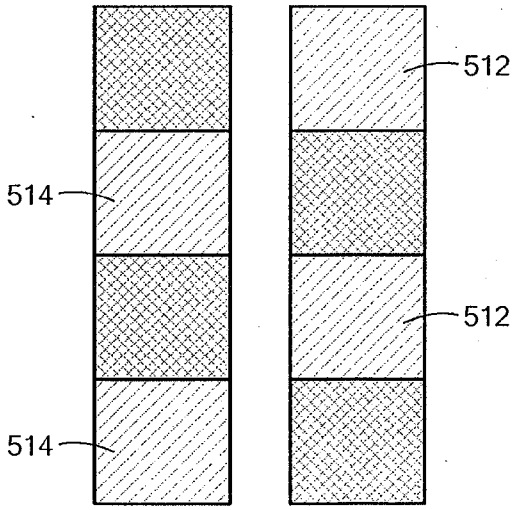


FIG. 5B

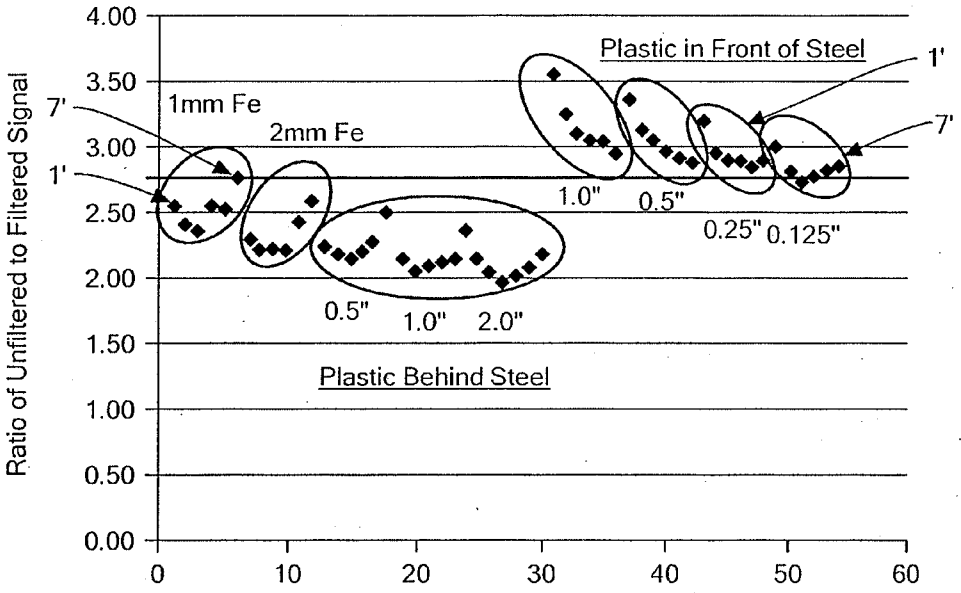

Ratio of Unfiltered to Filtered Signal
4.00
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Plastic Behind Steel
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FIG. 6

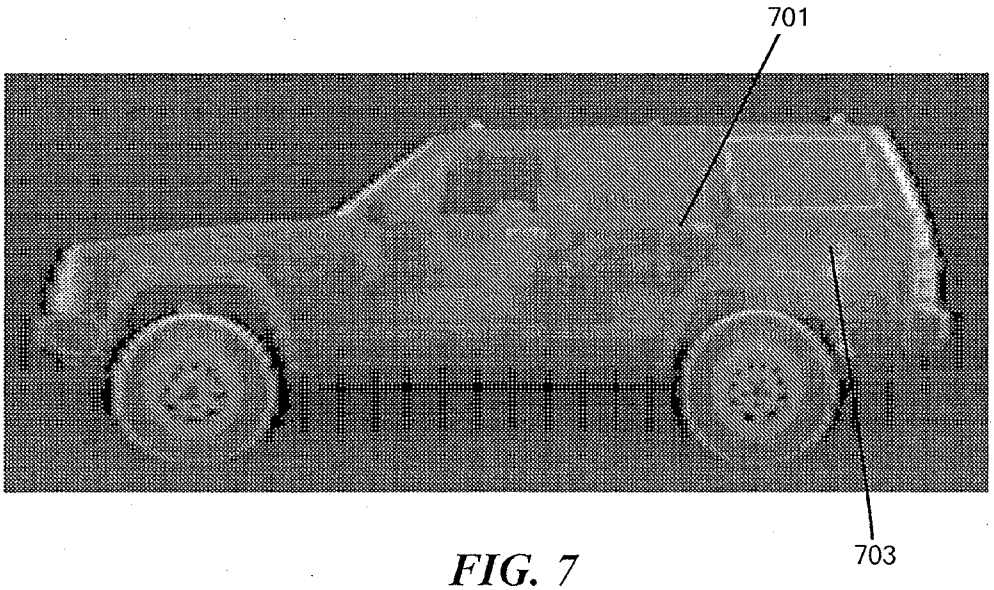

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703

FIG. 7