(54) **LEARNING, STORING, ANALYZING, AND REASONING ABOUT THE LOSS OF LOCATION-IDENTIFYING SIGNALS**

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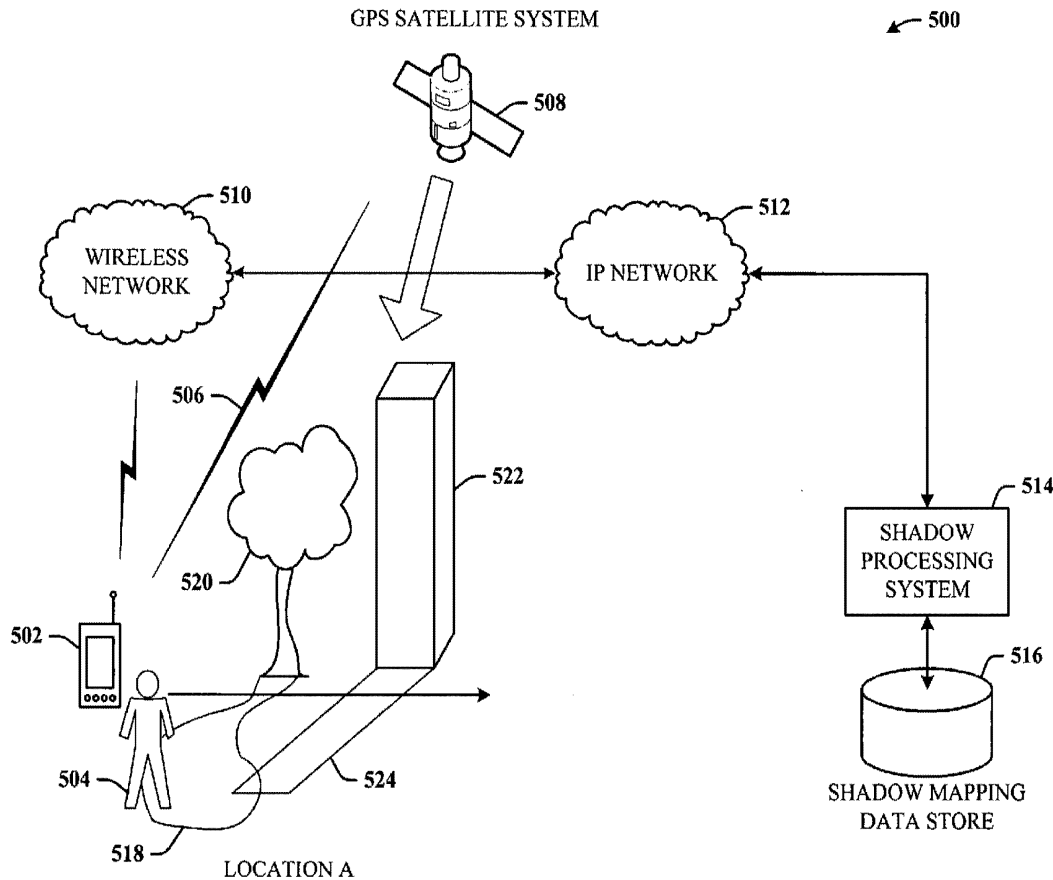
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(57) **ABSTRACT**

A location-centric signal shadow mapping and storing architecture that creates maps where signals, such as GPS, cannot be seen with ease because of natural or synthetic features such as groups of tall buildings. Such maps are used with other information, such as the dynamics of the sensed velocity that had been seen before the loss of the signals, to reason about the location and likely activities being carried out by one or more people. Inferences can be made based on information about organizations and services associated with structures and locations proximal to the locations where signals were lost. Also, such reasoning can be used to turn off or to reduce the power consumed by the receivers of the location information, potentially with the joint use of accelerometers to identify when significant accelerations occur.
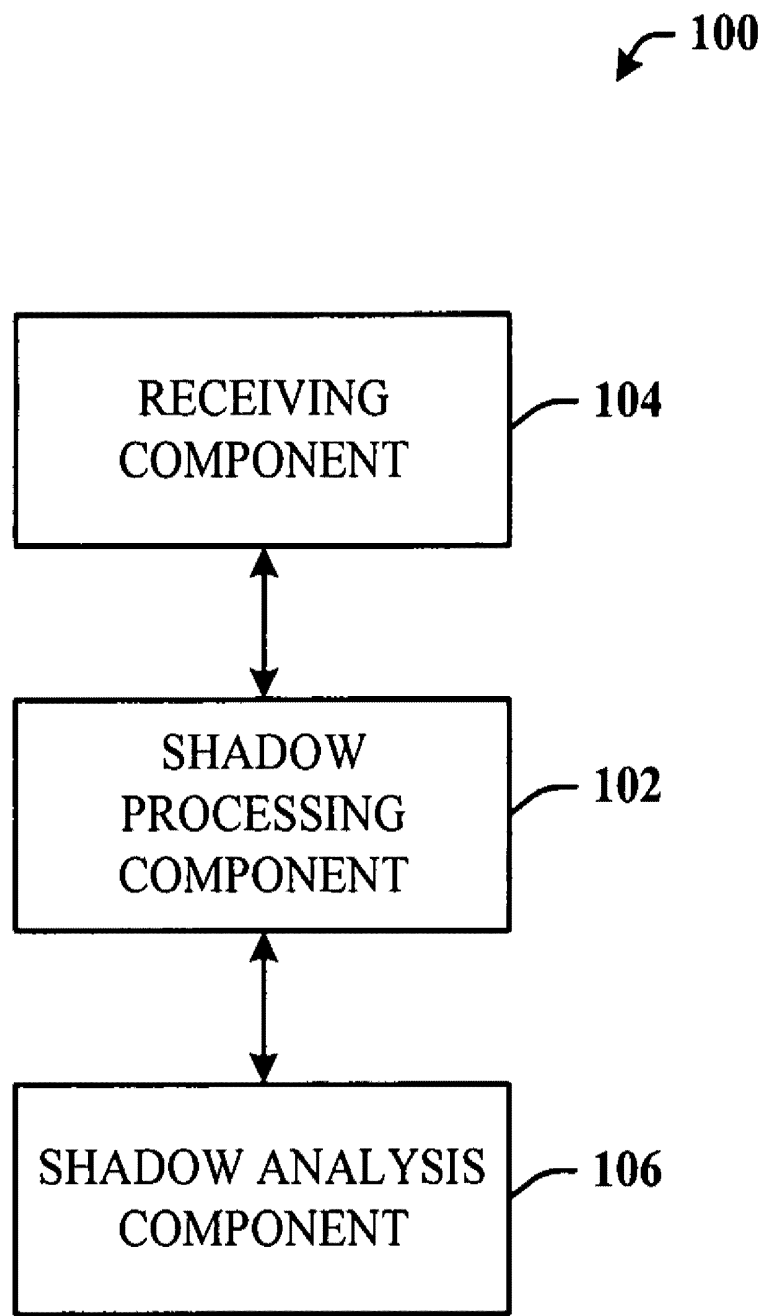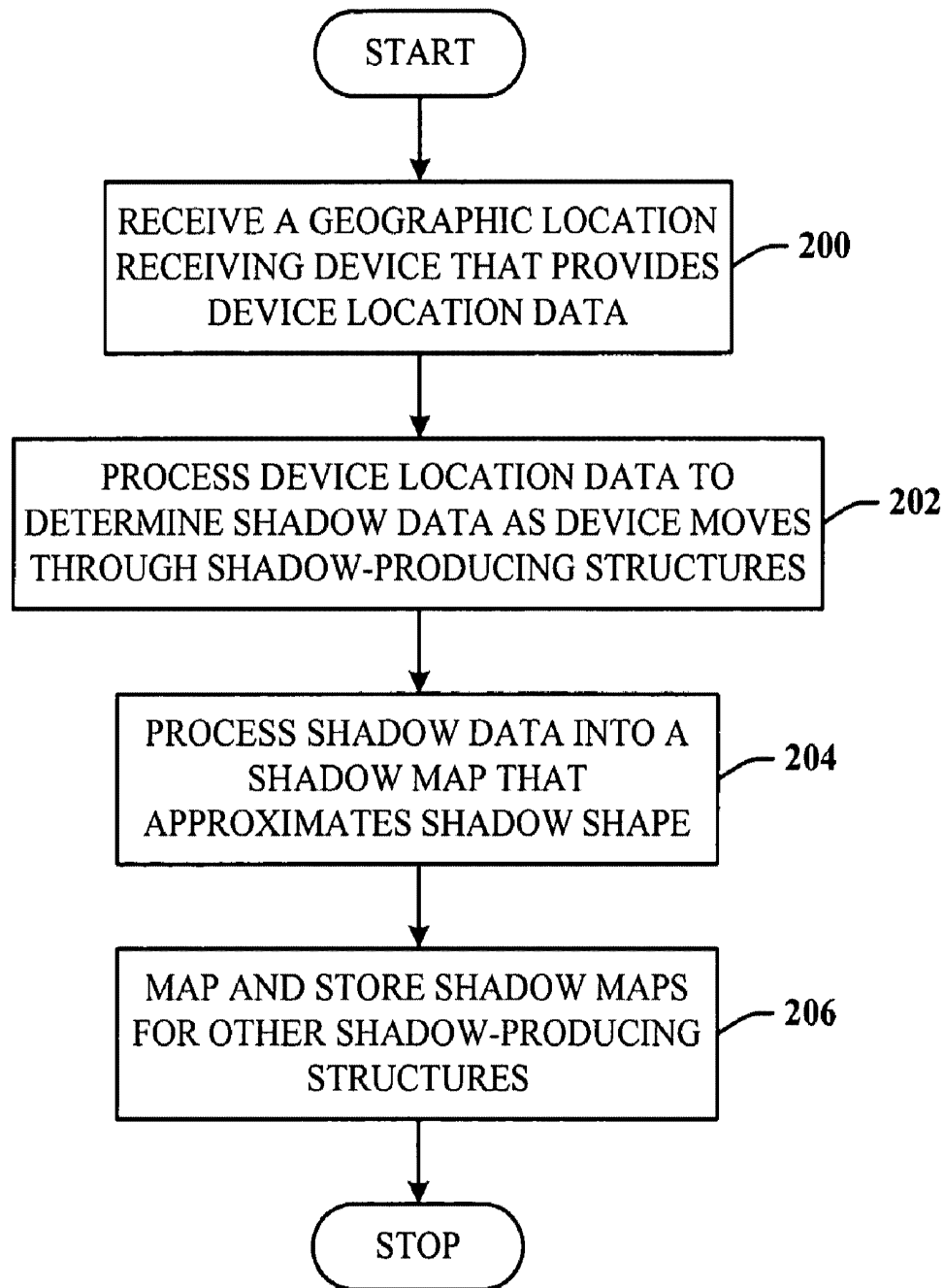
100

RECEIVING
COMPONENT — 104

SHADOW
PROCESSING
COMPONENT — 102

SHADOW ANALYSIS
COMPONENT — 106

FIG. 1

START

RECEIVE A GEOGRAPHIC LOCATION
RECEIVING DEVICE THAT PROVIDES
DEVICE LOCATION DATA — 200

PROCESS DEVICE LOCATION DATA TO
DETERMINE SHADOW DATA AS DEVICE MOVES
THROUGH SHADOW-PRODUCING STRUCTURES — 202

PROCESS SHADOW DATA INTO A
SHADOW MAP THAT
APPROXIMATES SHADOW SHAPE — 204

MAP AND STORE SHADOW MAPS
FOR OTHER SHADOW-PRODUCING
STRUCTURES — 206

STOP

FIG. 2

START

RECEIVE PORTABLE DEVICE HAVING GEOGRAPHIC LOCATION TECHNOLOGY TO PROVIDE DEVICE LOCATION DATA AND DEVICE HEALTH DATA — 300

TRANSMIT DEVICE HEALTH DATA AND DEVICE LOCATION DATA TO SHADOW PROCESSING SYSTEM AS DEVICE IS MOVED AMONG STRUCTURES — 302

PROCESS DEVICE DATA TO DETERMINE INTEGRITY OF DEVICE LOCATION DATA — 304

GENERATE SHADOW MAP OF STRUCTURES BASED ON TEMPORAL INFORMATION AND DEVICE LOCATION DATA — 306

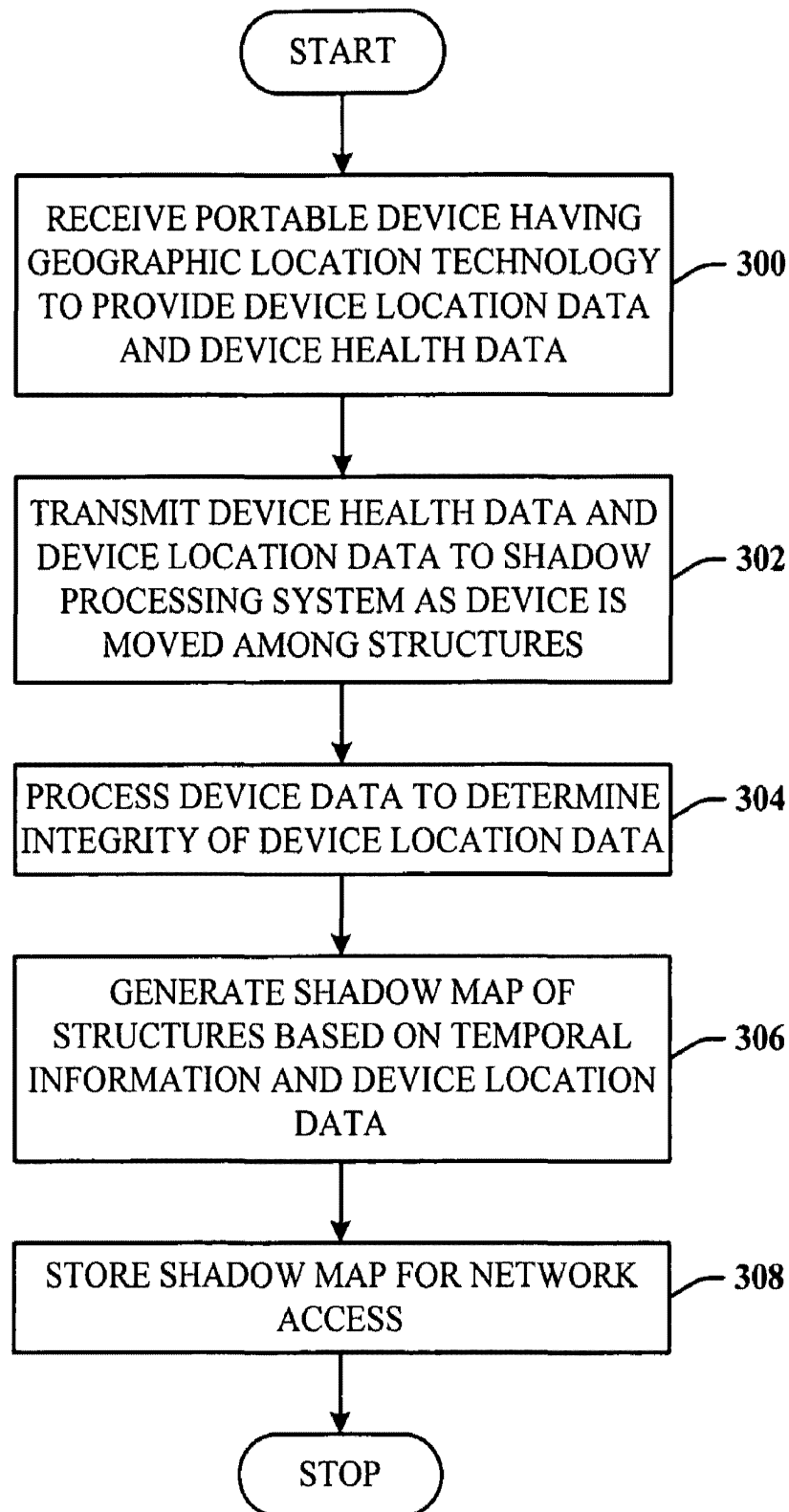STORE SHADOW MAP FOR NETWORK ACCESS — 308
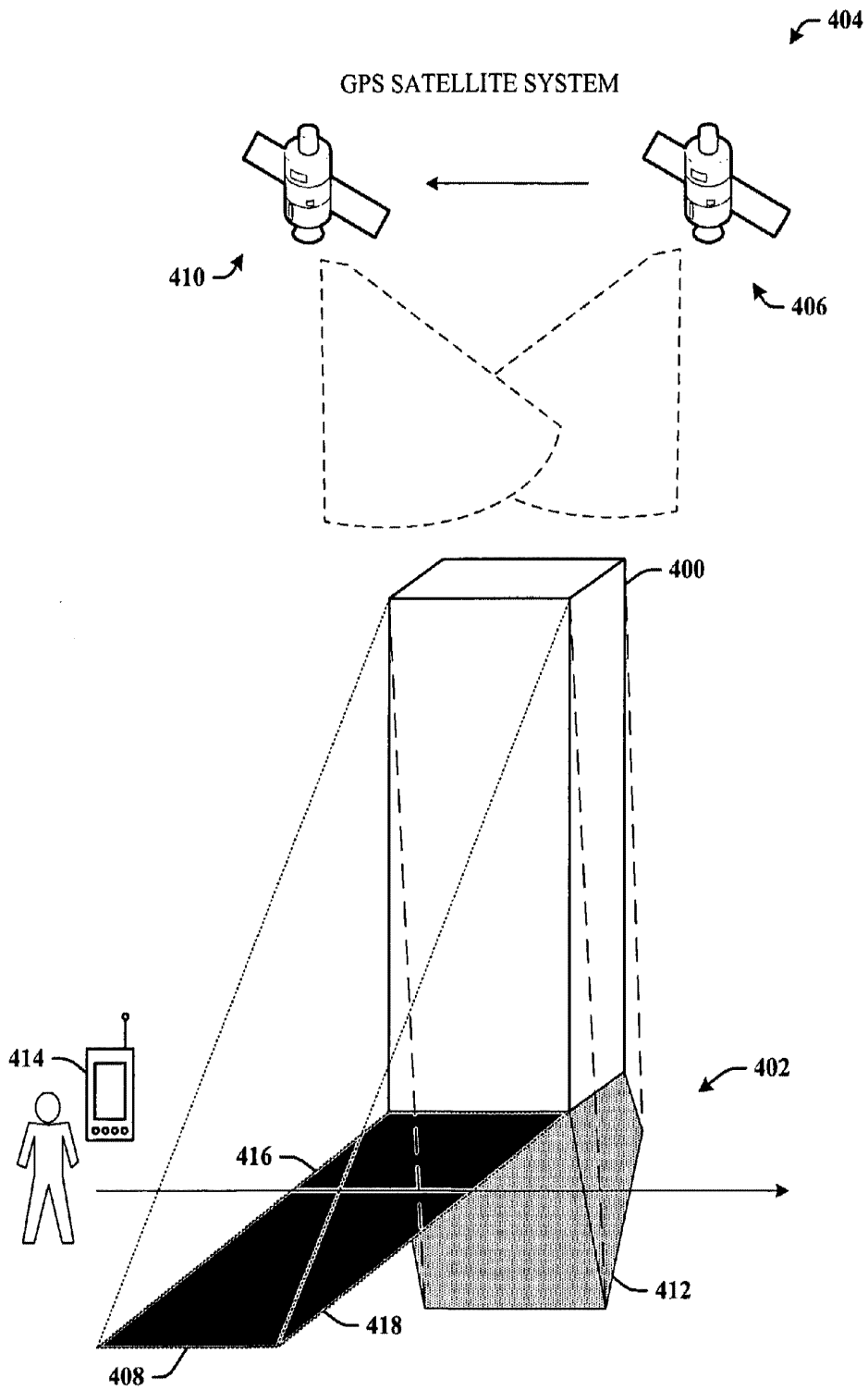
STOP

FIG. 3

FIG. 4

DOCKET ALARM

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