FIG. 1

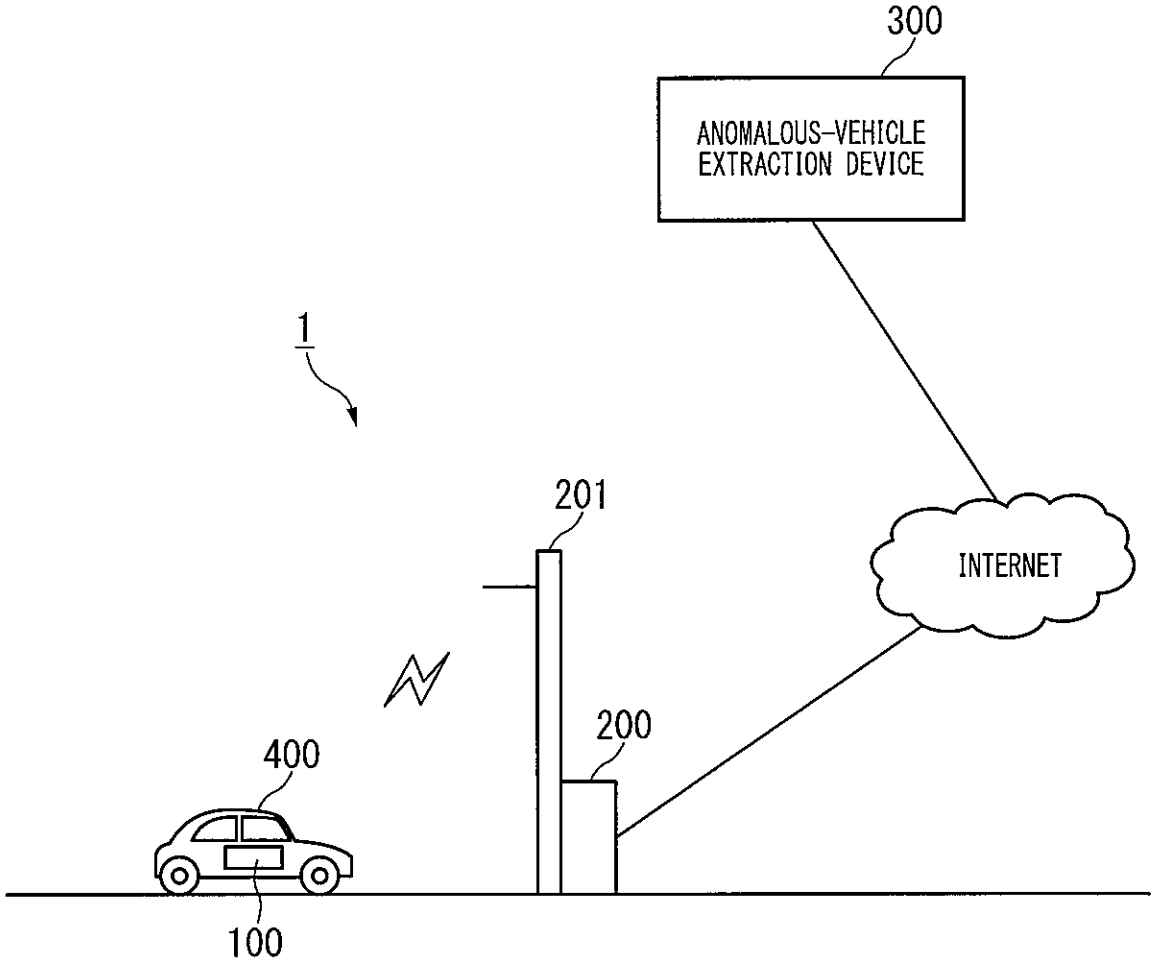

300
ANOMALOUS-VEHICLE EXTRACTION DEVICE
1
201
INTERNET
200
400
100

FIG. 2

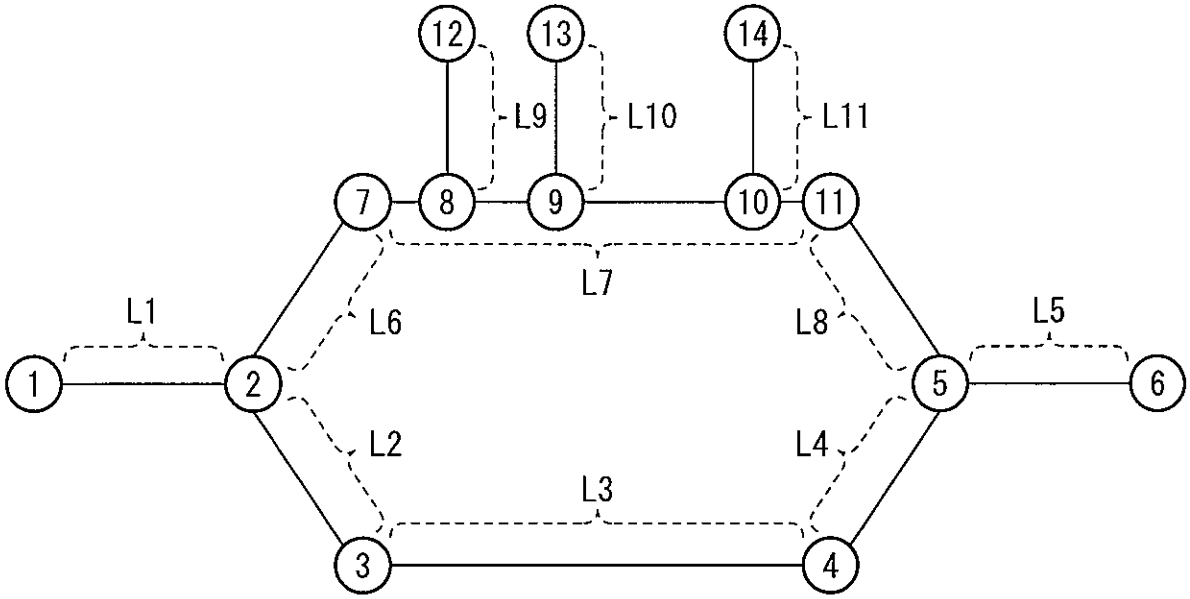

12
13
14
L9
L10
L11
7
8
9
10
11
L7
L1
L6
L8
L5
1
2
5
6
L2
L4
L3
3
4

FIG. 3

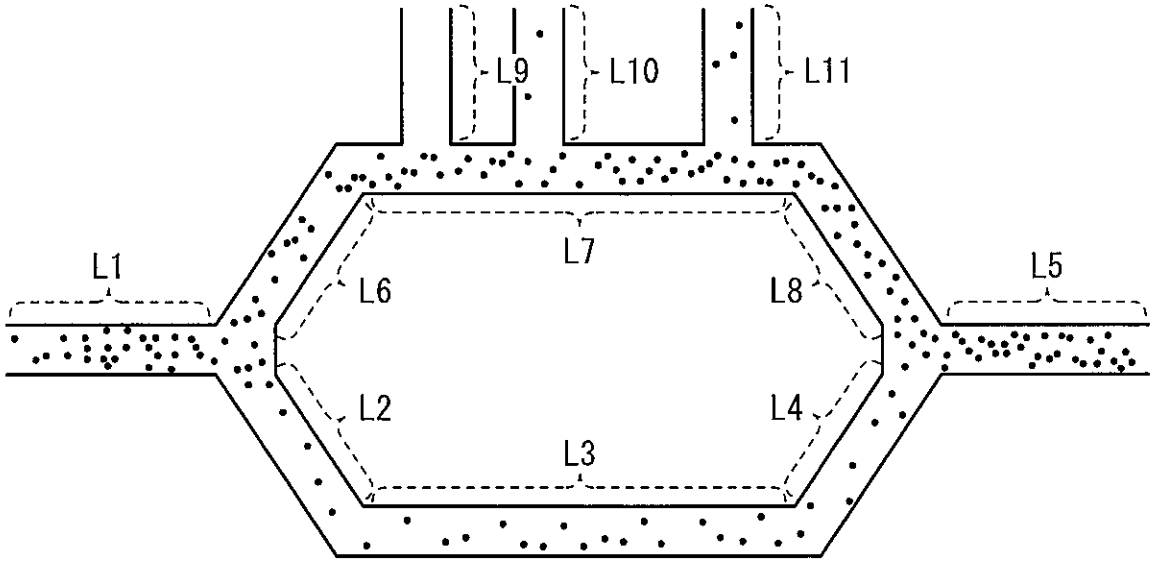

L9
L10
L11
L7
L1
L6
L8
L5
L2
L4
L3

FIG. 4

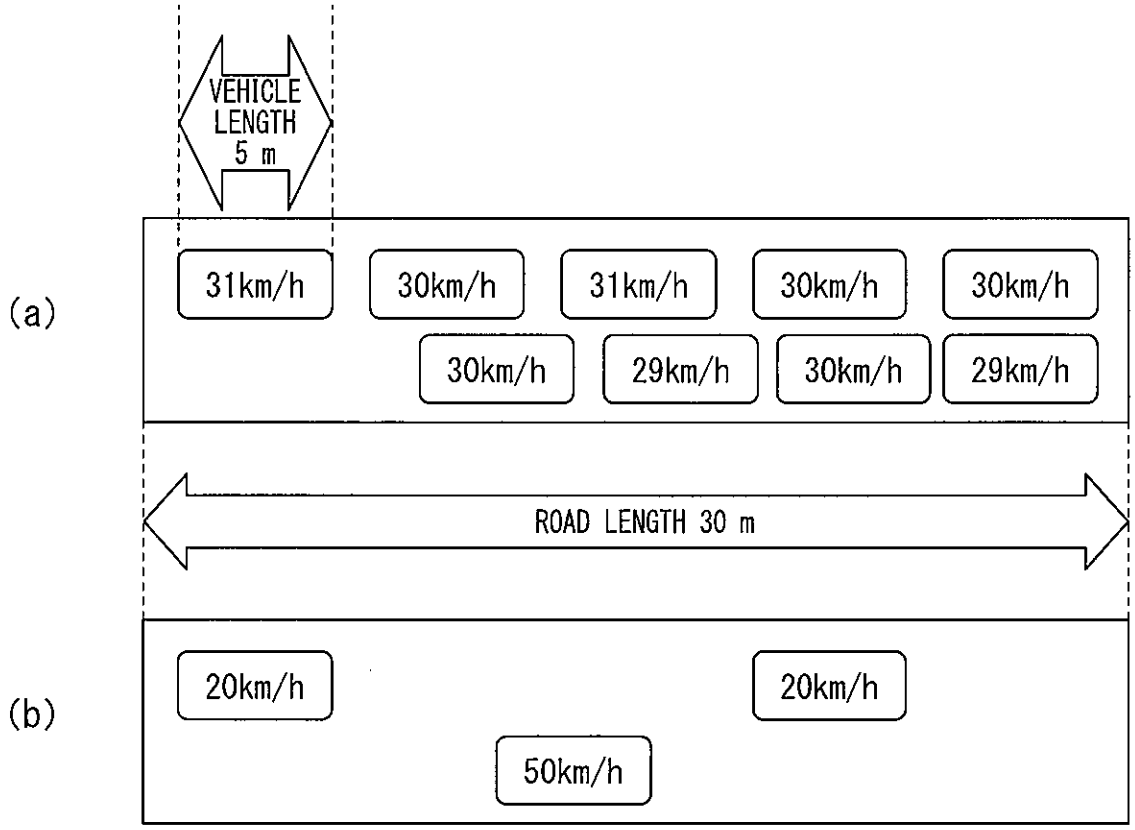

VEHICLE LENGTH 5 m
(a)
31km/h
30km/h
31km/h
30km/h
30km/h
30km/h
29km/h
30km/h
29km/h
ROAD LENGTH 30 m
(b)
20km/h
20km/h
50km/h

FIG. 5

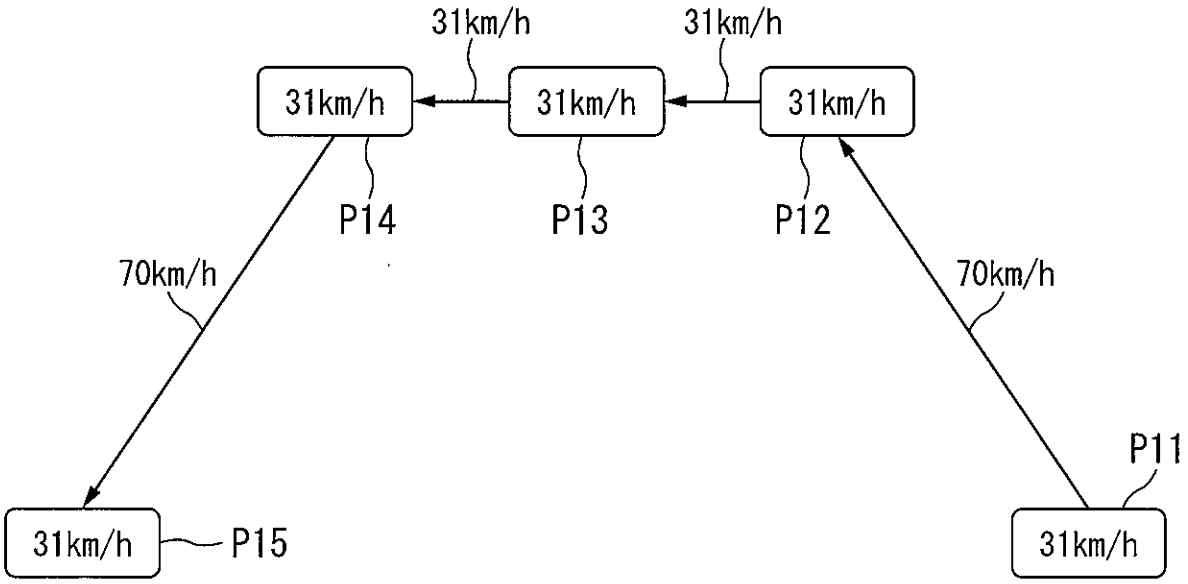

31km/h
31km/h
31km/h
31km/h
31km/h
P14
P13
P12
70km/h
70km/h
P11
31km/h
P15
31km/h

FIG. 6

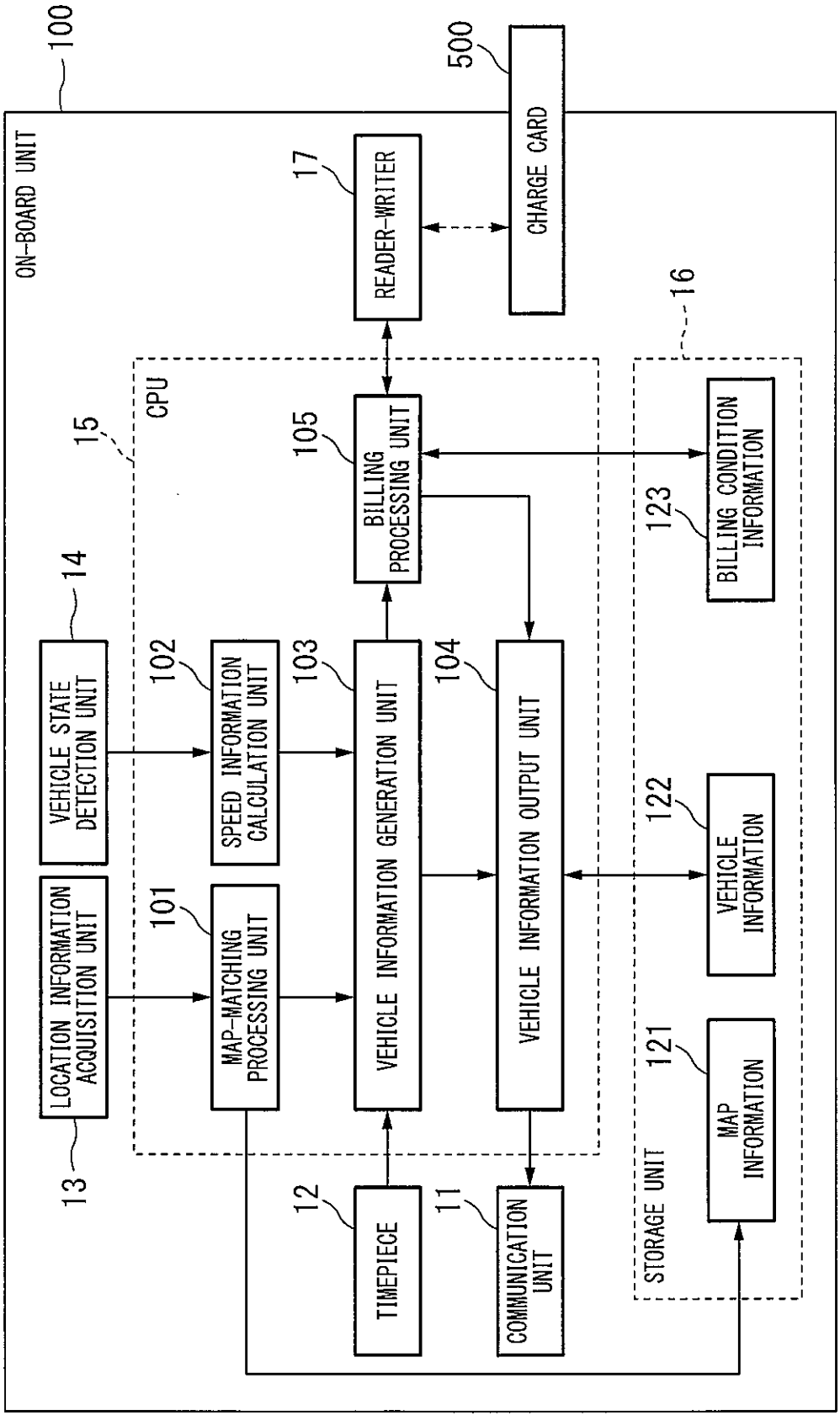

100
ON-BOARD UNIT
500
CHARGE CARD
17
READER-WRITER
16
15
CPU
105
BILLING PROCESSING UNIT
123
BILLING CONDITION INFORMATION
14
VEHICLE STATE DETECTION UNIT
102
SPEED INFORMATION CALCULATION UNIT
103
VEHICLE INFORMATION GENERATION UNIT
104
VEHICLE INFORMATION OUTPUT UNIT
122
VEHICLE INFORMATION
101
MAP-MATCHING PROCESSING UNIT
LOCATION INFORMATION ACQUISITION UNIT
13
12
TIMEPIECE
11
COMMUNICATION UNIT
STORAGE UNIT
121
MAP INFORMATION

FIG. 7

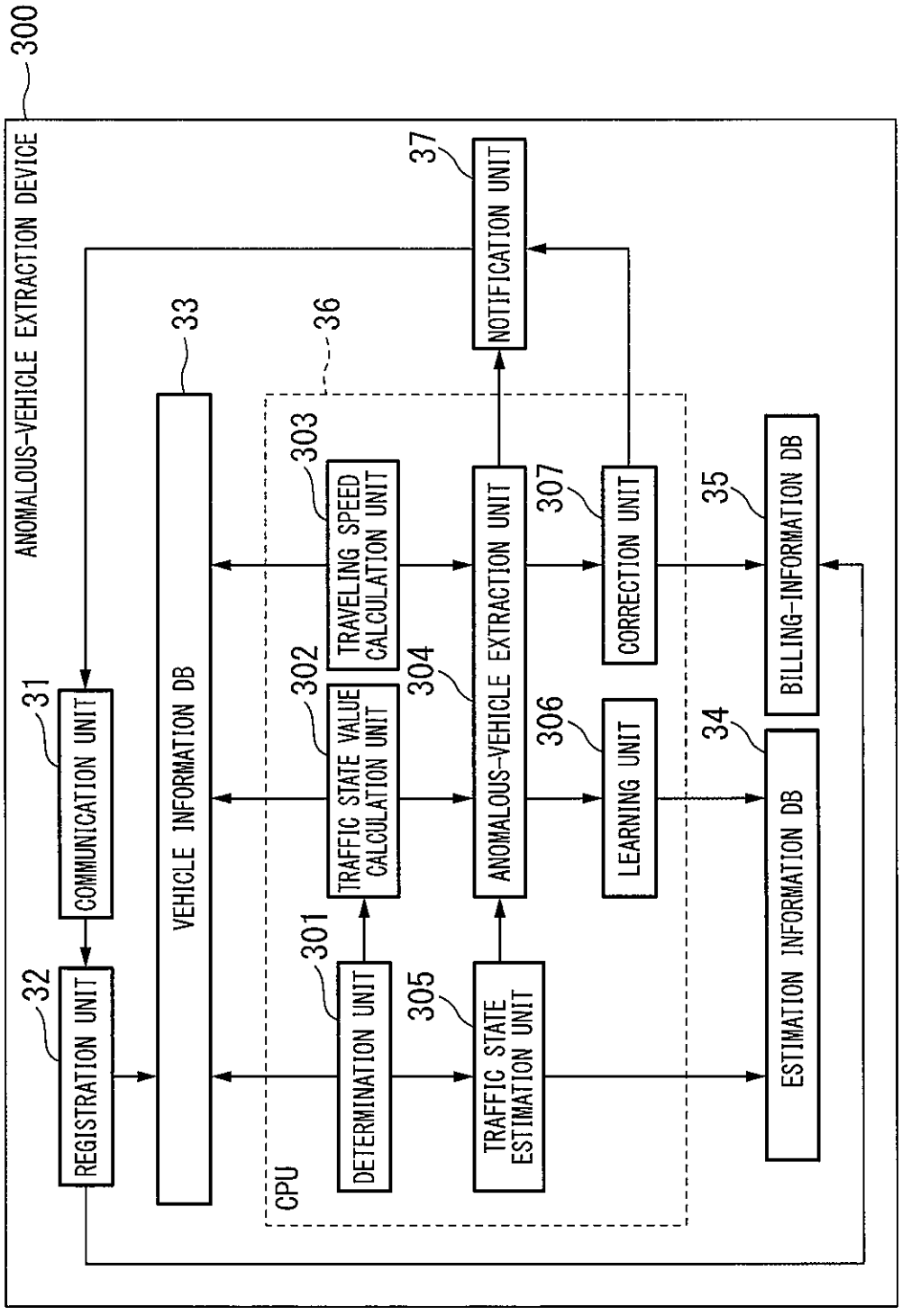

300
ANOMALOUS-VEHICLE EXTRACTION DEVICE
31
COMMUNICATION UNIT
32
REGISTRATION UNIT
33
VEHICLE INFORMATION DB
36
CPU
301
DETERMINATION UNIT
302
TRAFFIC STATE VALUE CALCULATION UNIT
303
TRAVELING SPEED CALCULATION UNIT
304
ANOMALOUS-VEHICLE EXTRACTION UNIT
305
TRAFFIC STATE ESTIMATION UNIT
306
LEARNING UNIT
307
CORRECTION UNIT
34
ESTIMATION INFORMATION DB
35
BILLING-INFORMATION DB
37
NOTIFICATION UNIT

FIG. 8

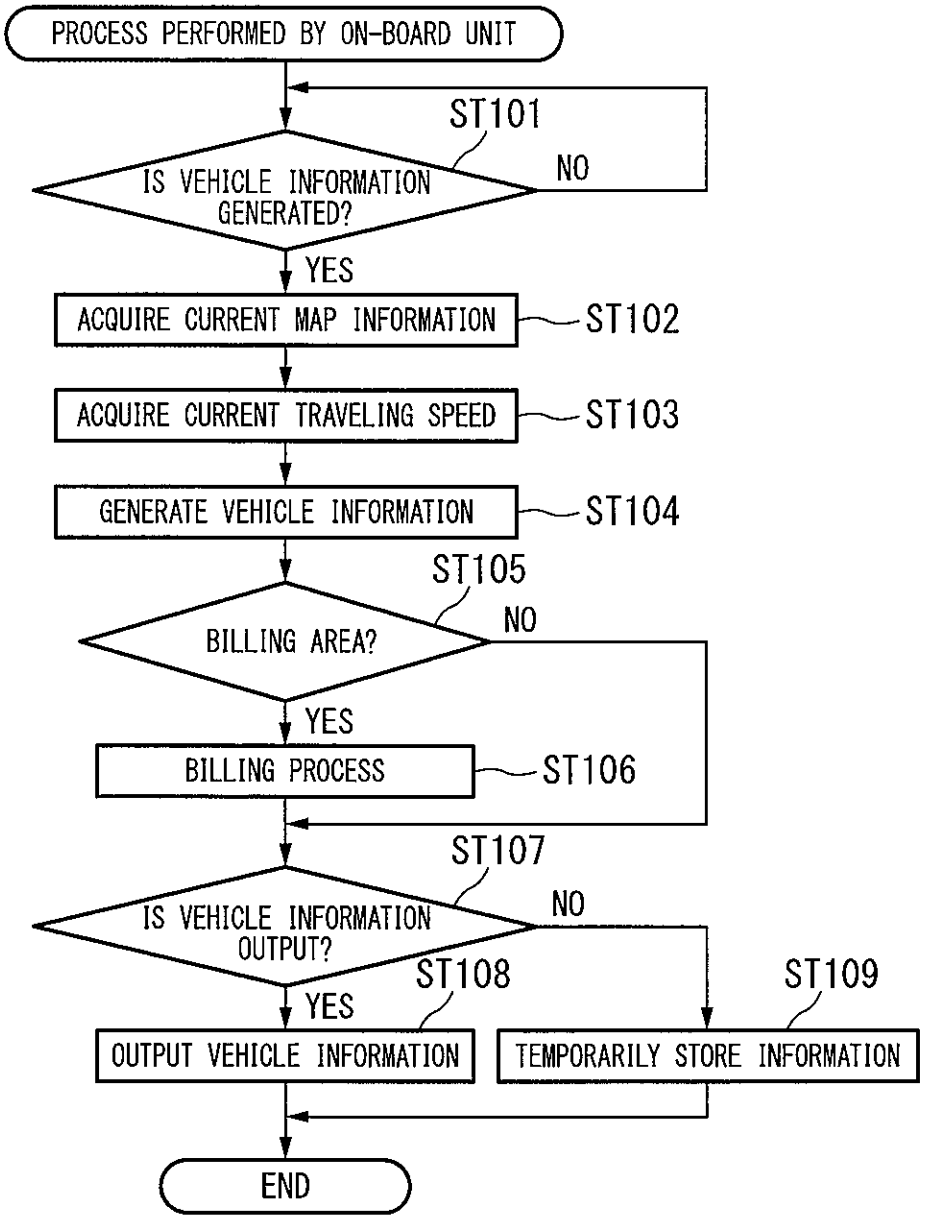

PROCESS PERFORMED BY ON-BOARD UNIT
ST101
IS VEHICLE INFORMATION GENERATED?
NO
YES
ACQUIRE CURRENT MAP INFORMATION
ST102
ACQUIRE CURRENT TRAVELING SPEED
ST103
GENERATE VEHICLE INFORMATION
ST104
ST105
BILLING AREA?
NO
YES
BILLING PROCESS
ST106
ST107
IS VEHICLE INFORMATION OUTPUT?
NO
ST108
YES
ST109
OUTPUT VEHICLE INFORMATION
TEMPORARILY STORE INFORMATION
END

FIG. 9

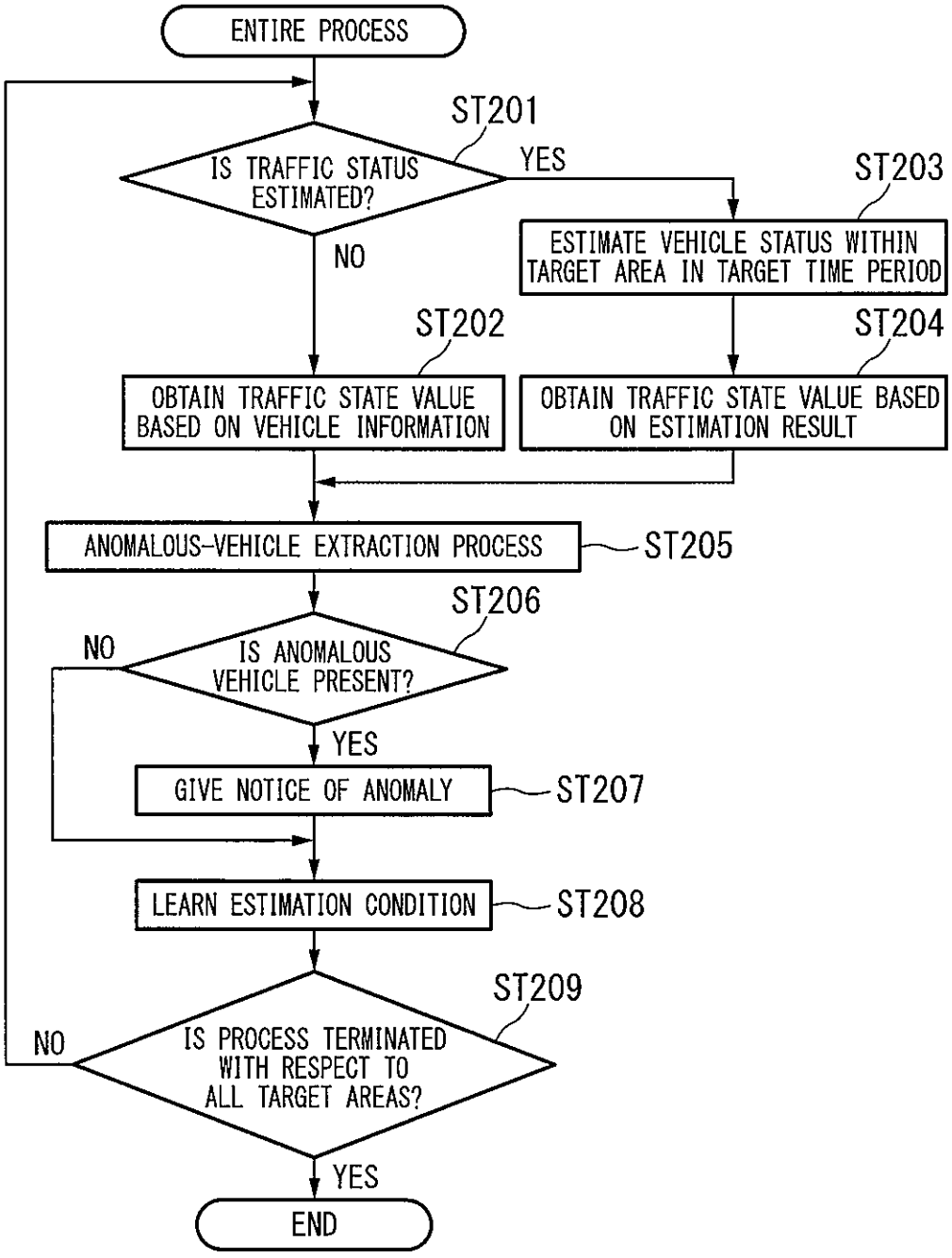
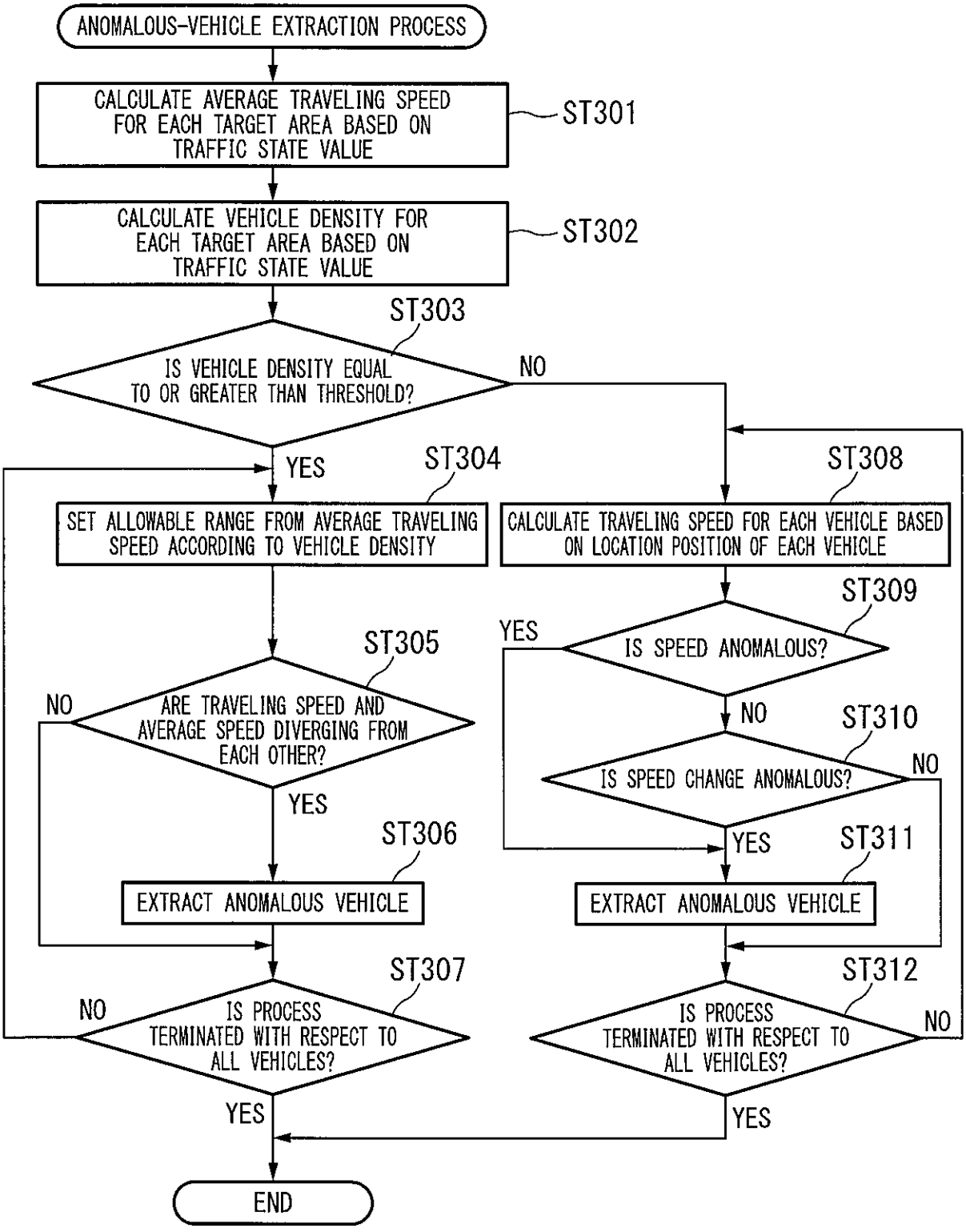

ENTIRE PROCESS
ST201
IS TRAFFIC STATUS ESTIMATED?
YES
NO
ST203
ESTIMATE VEHICLE STATUS WITHIN TARGET AREA IN TARGET TIME PERIOD
ST202
OBTAIN TRAFFIC STATE VALUE BASED ON VEHICLE INFORMATION
ST204
OBTAIN TRAFFIC STATE VALUE BASED ON ESTIMATION RESULT
ANOMALOUS-VEHICLE EXTRACTION PROCESS
ST205
ST206
NO
IS ANOMALOUS VEHICLE PRESENT?
YES
GIVE NOTICE OF ANOMALY
ST207
LEARN ESTIMATION CONDITION
ST208
ST209
NO
IS PROCESS TERMINATED WITH RESPECT TO ALL TARGET AREAS?
YES
END

FIG. 10


ANOMALOUS-VEHICLE EXTRACTION PROCESS
CALCULATE AVERAGE TRAVELING SPEED FOR EACH TARGET AREA BASED ON TRAFFIC STATE VALUE
ST301
CALCULATE VEHICLE DENSITY FOR EACH TARGET AREA BASED ON TRAFFIC STATE VALUE
ST302
ST303
IS VEHICLE DENSITY EQUAL TO OR GREATER THAN THRESHOLD?
NO
YES
ST304
SET ALLOWABLE RANGE FROM AVERAGE TRAVELING SPEED ACCORDING TO VEHICLE DENSITY
ST305
NO
ARE TRAVELING SPEED AND AVERAGE SPEED DIVERGING FROM EACH OTHER?
YES
ST306
EXTRACT ANOMALOUS VEHICLE
ST307
NO
IS PROCESS TERMINATED WITH RESPECT TO ALL VEHICLES?
YES
ST308
CALCULATE TRAVELING SPEED FOR EACH VEHICLE BASED ON LOCATION POSITION OF EACH VEHICLE
ST309
YES
IS SPEED ANOMALOUS?
NO
ST310
IS SPEED CHANGE ANOMALOUS?
NO
YES
ST311
EXTRACT ANOMALOUS VEHICLE
ST312
IS PROCESS TERMINATED WITH RESPECT TO ALL VEHICLES?
NO
YES
END