FIG. 1

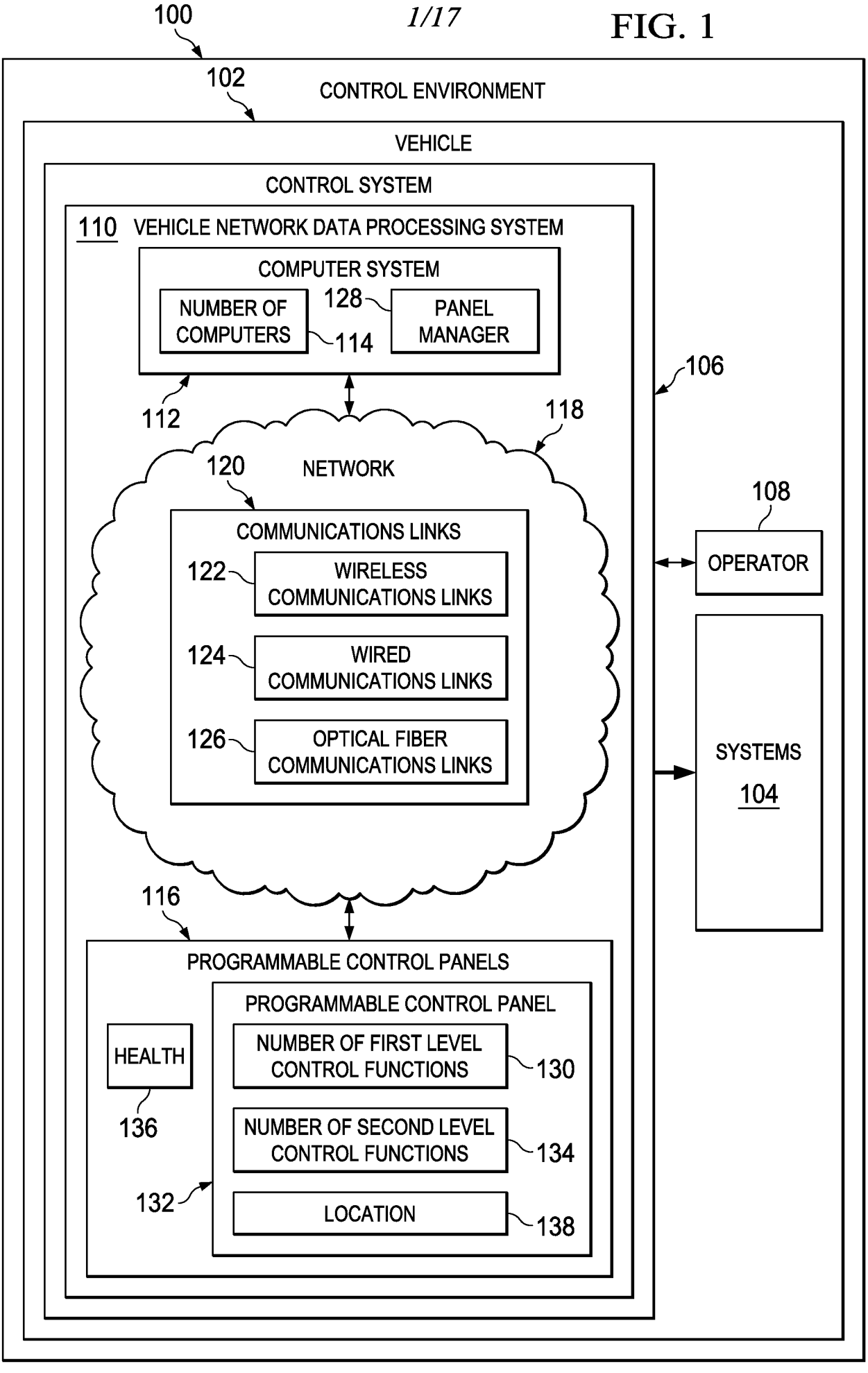

100
102
CONTROL ENVIRONMENT
VEHICLE
CONTROL SYSTEM
110 VEHICLE NETWORK DATA PROCESSING SYSTEM
COMPUTER SYSTEM
NUMBER OF COMPUTERS
114
128
PANEL MANAGER
112
106
118
120
NETWORK
108
COMMUNICATIONS LINKS
122
WIRELESS COMMUNICATIONS LINKS
124
WIRED COMMUNICATIONS LINKS
126
OPTICAL FIBER COMMUNICATIONS LINKS
OPERATOR
SYSTEMS
104
116
PROGRAMMABLE CONTROL PANELS
PROGRAMMABLE CONTROL PANEL
HEALTH
136
NUMBER OF FIRST LEVEL CONTROL FUNCTIONS
130
NUMBER OF SECOND LEVEL CONTROL FUNCTIONS
134
132
LOCATION
138

FIG. 2

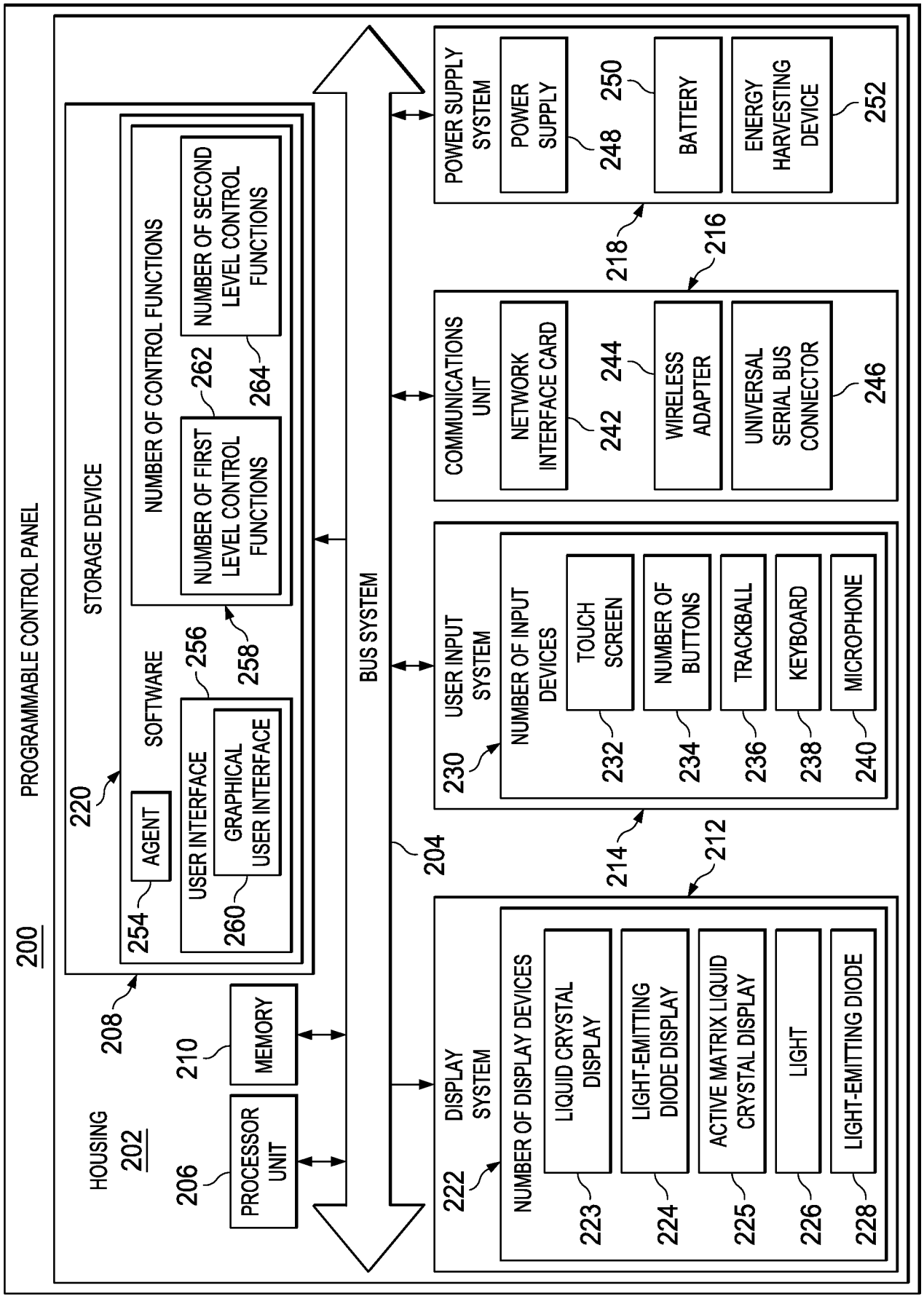

200
PROGRAMMABLE CONTROL PANEL
HOUSING
202
206
PROCESSOR UNIT
210
MEMORY
208
STORAGE DEVICE
220
254
AGENT
SOFTWARE
USER INTERFACE
260
GRAPHICAL USER INTERFACE
256
258
NUMBER OF CONTROL FUNCTIONS
NUMBER OF FIRST LEVEL CONTROL FUNCTIONS
262
NUMBER OF SECOND LEVEL CONTROL FUNCTIONS
264
BUS SYSTEM
204
214
212
DISPLAY SYSTEM
222
NUMBER OF DISPLAY DEVICES
LIQUID CRYSTAL DISPLAY
223
LIGHT-EMITTING DIODE DISPLAY
224
ACTIVE MATRIX LIQUID CRYSTAL DISPLAY
225
LIGHT
226
LIGHT-EMITTING DIODE
228
USER INPUT SYSTEM
230
NUMBER OF INPUT DEVICES
TOUCH SCREEN
232
NUMBER OF BUTTONS
234
TRACKBALL
236
KEYBOARD
238
MICROPHONE
240
COMMUNICATIONS UNIT
216
NETWORK INTERFACE CARD
242
WIRELESS ADAPTER
244
UNIVERSAL SERIAL BUS CONNECTOR
246
218
POWER SUPPLY SYSTEM
POWER SUPPLY
248
BATTERY
250
ENERGY HARVESTING DEVICE
252

FIG. 3

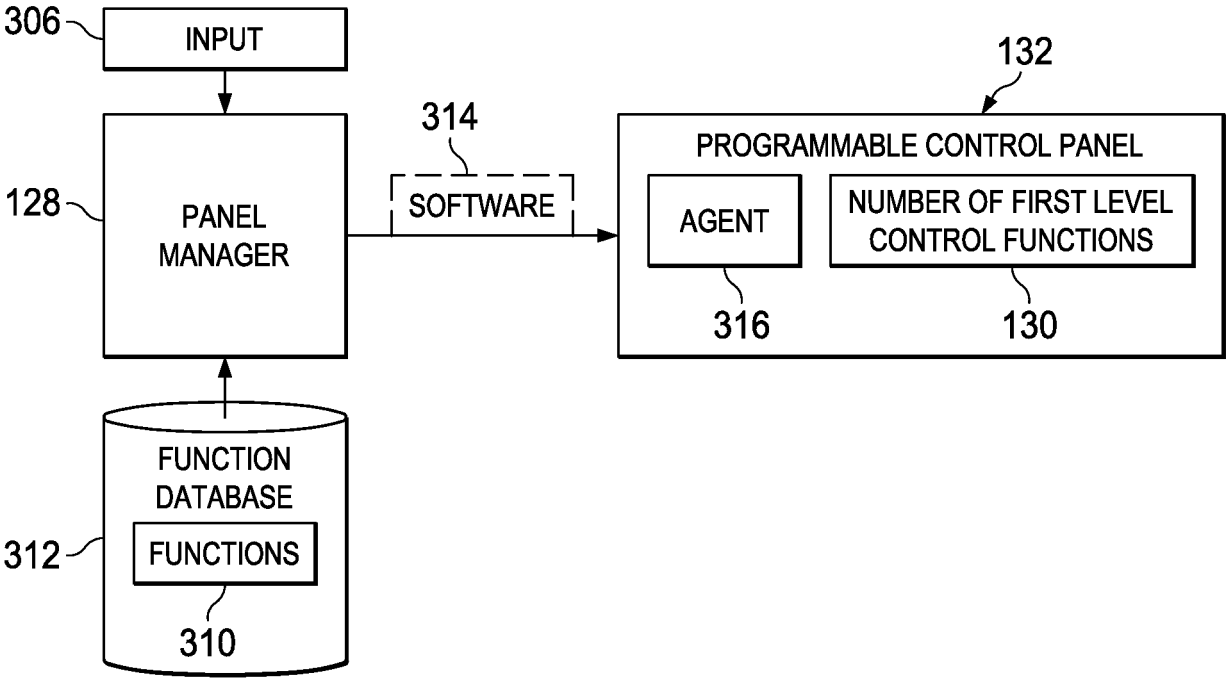

306
INPUT
132
314
PROGRAMMABLE CONTROL PANEL
128
PANEL MANAGER
SOFTWARE
AGENT
NUMBER OF FIRST LEVEL CONTROL FUNCTIONS
316
130
FUNCTION DATABASE
312
FUNCTIONS
310

FIG. 7

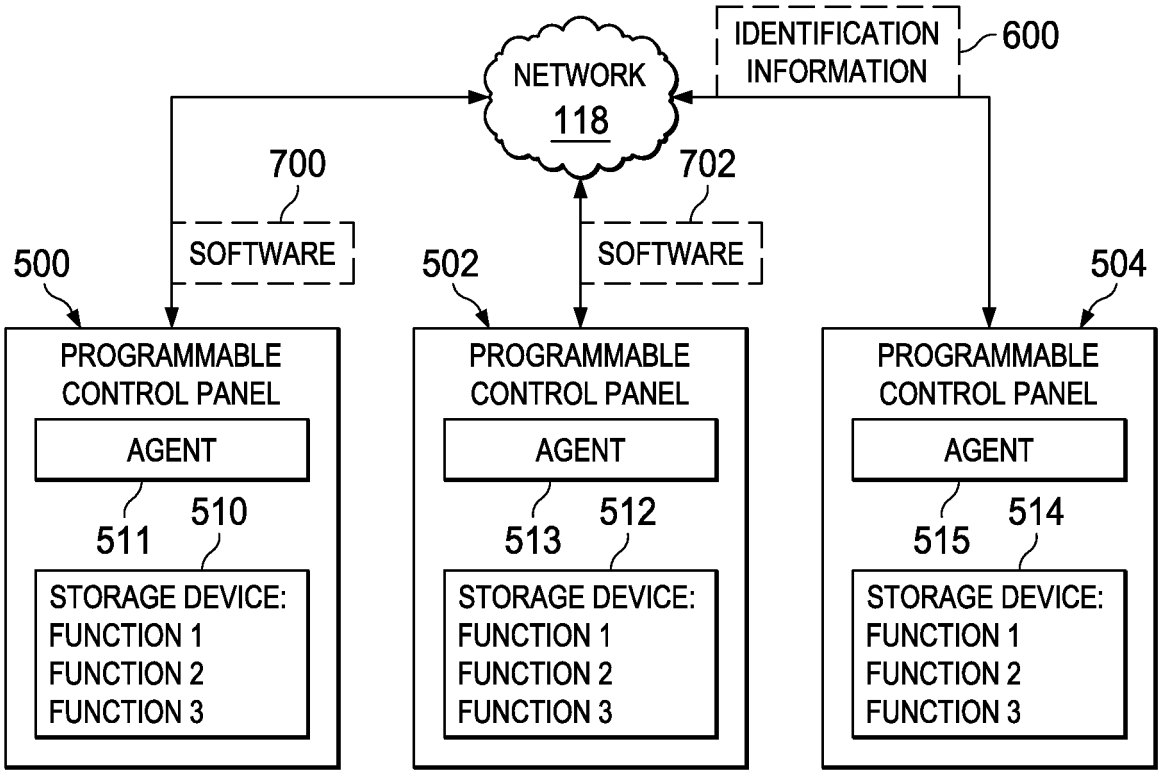

NETWORK
118
IDENTIFICATION INFORMATION
600
700
702
SOFTWARE
SOFTWARE
500
502
504
PROGRAMMABLE CONTROL PANEL
AGENT
511
510
STORAGE DEVICE:
FUNCTION 1
FUNCTION 2
FUNCTION 3
PROGRAMMABLE CONTROL PANEL
AGENT
513
512
STORAGE DEVICE:
FUNCTION 1
FUNCTION 2
FUNCTION 3
PROGRAMMABLE CONTROL PANEL
AGENT
515
514
STORAGE DEVICE:
FUNCTION 1
FUNCTION 2
FUNCTION 3

FIG. 4

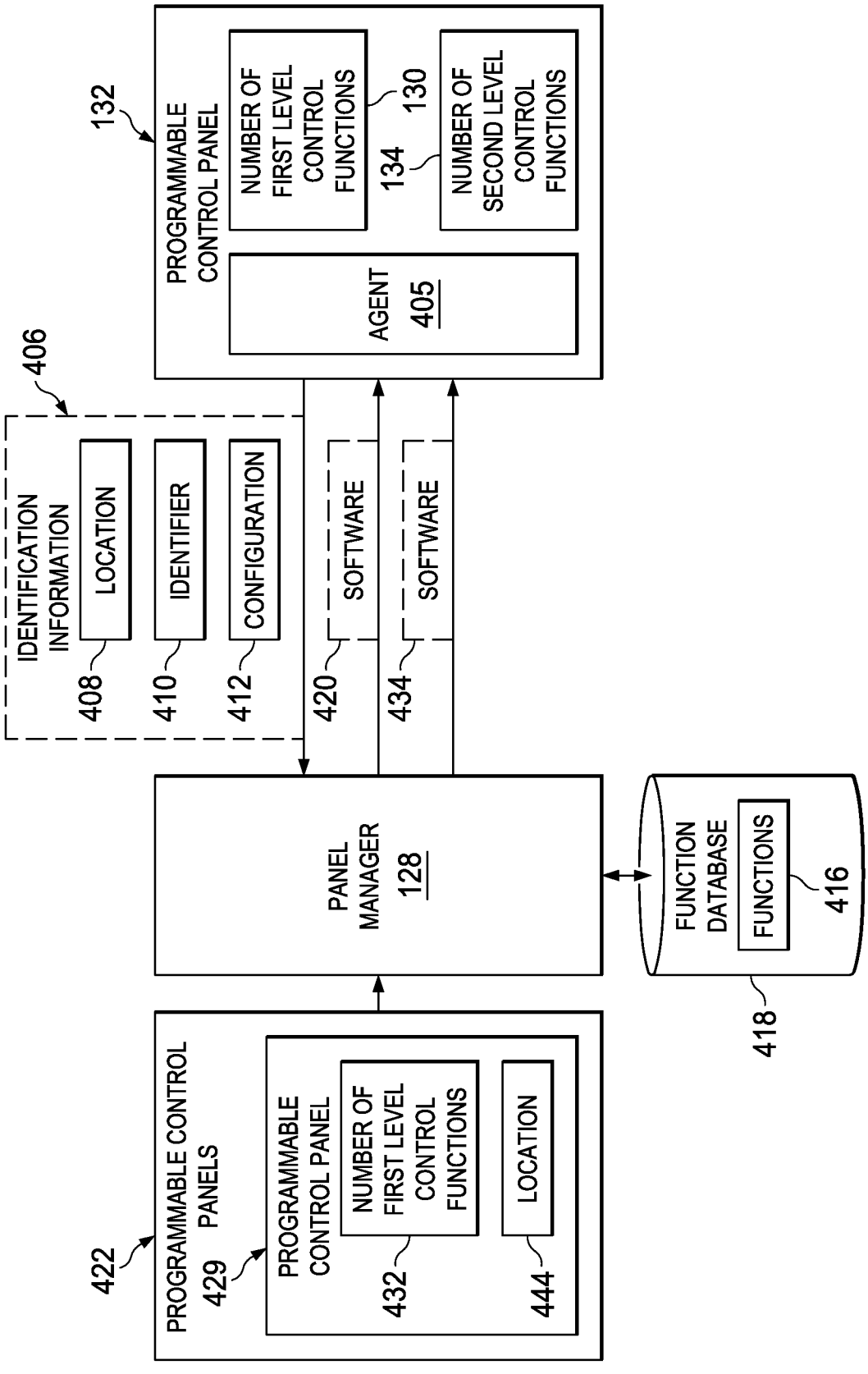

132
PROGRAMMABLE CONTROL PANEL
NUMBER OF FIRST LEVEL CONTROL FUNCTIONS
130
134
NUMBER OF SECOND LEVEL CONTROL FUNCTIONS
AGENT 405
406
IDENTIFICATION INFORMATION
LOCATION
IDENTIFIER
CONFIGURATION
408
410
412
SOFTWARE
420
SOFTWARE
434
PANEL MANAGER 128
FUNCTION DATABASE
FUNCTIONS
416
418
422
PROGRAMMABLE CONTROL PANELS
429
PROGRAMMABLE CONTROL PANEL
NUMBER OF FIRST LEVEL CONTROL FUNCTIONS
432
LOCATION
444

FIG. 5

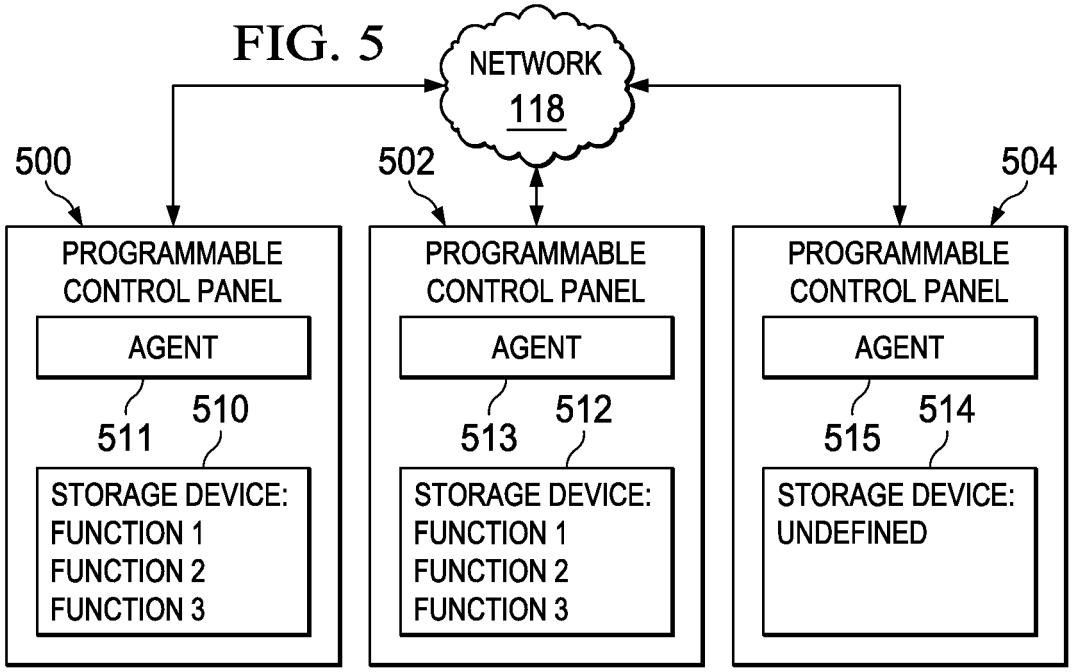

NETWORK
118
500
502
504
PROGRAMMABLE CONTROL PANEL
AGENT
511
510
STORAGE DEVICE:
FUNCTION 1
FUNCTION 2
FUNCTION 3
PROGRAMMABLE CONTROL PANEL
AGENT
513
512
STORAGE DEVICE:
FUNCTION 1
FUNCTION 2
FUNCTION 3
PROGRAMMABLE CONTROL PANEL
AGENT
515
514
STORAGE DEVICE:
UNDEFINED

FIG. 6

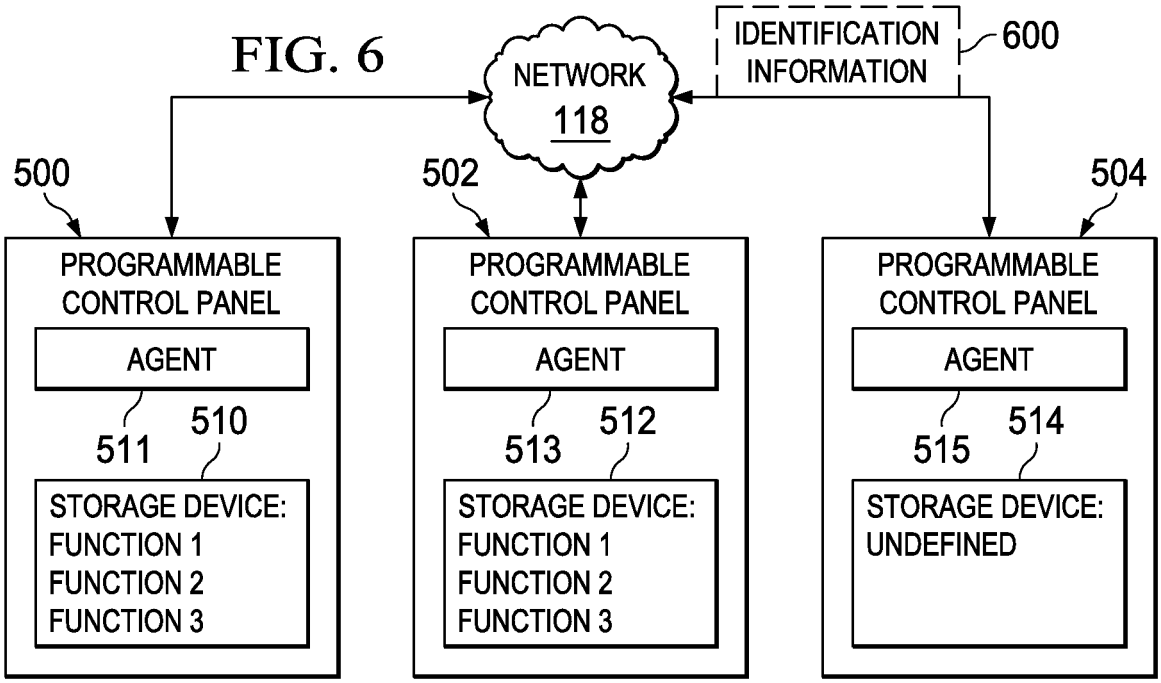

IDENTIFICATION INFORMATION
600
NETWORK
118
500
502
504
PROGRAMMABLE CONTROL PANEL
AGENT
511
510
STORAGE DEVICE:
FUNCTION 1
FUNCTION 2
FUNCTION 3
PROGRAMMABLE CONTROL PANEL
AGENT
513
512
STORAGE DEVICE:
FUNCTION 1
FUNCTION 2
FUNCTION 3
PROGRAMMABLE CONTROL PANEL
AGENT
515
514
STORAGE DEVICE:
UNDEFINED

FIG. 8

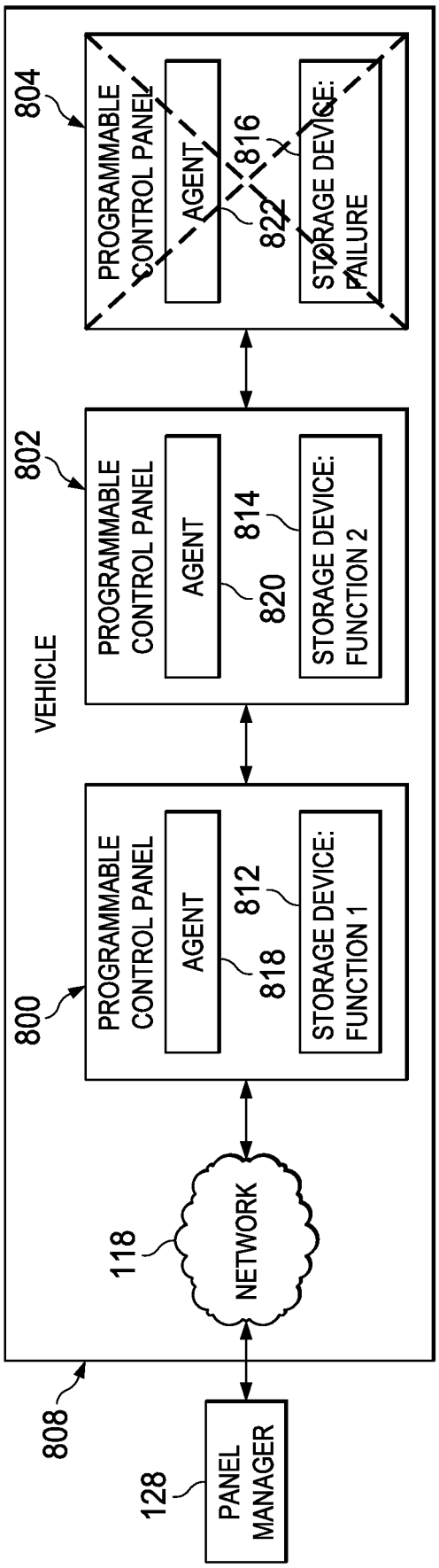

VEHICLE
800
PROGRAMMABLE CONTROL PANEL
AGENT
812
818
STORAGE DEVICE: FUNCTION 1
802
PROGRAMMABLE CONTROL PANEL
AGENT
814
820
STORAGE DEVICE: FUNCTION 2
804
PROGRAMMABLE CONTROL PANEL
AGENT
816
822
STORAGE DEVICE: FAILURE
118
NETWORK
808
128
PANEL MANAGER

FIG. 9

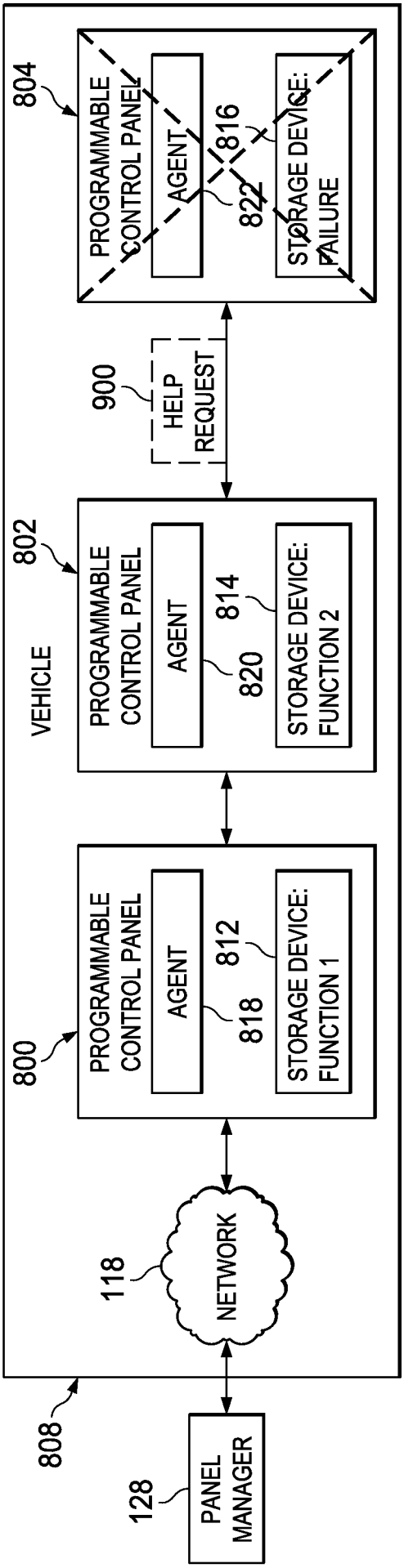

VEHICLE
800
PROGRAMMABLE CONTROL PANEL
AGENT
812
818
STORAGE DEVICE: FUNCTION 1
802
PROGRAMMABLE CONTROL PANEL
AGENT
814
820
STORAGE DEVICE: FUNCTION 2
804
PROGRAMMABLE CONTROL PANEL
AGENT
816
822
STORAGE DEVICE: FAILURE
900
HELP REQUEST
118
NETWORK
808
128
PANEL MANAGER

FIG. 10

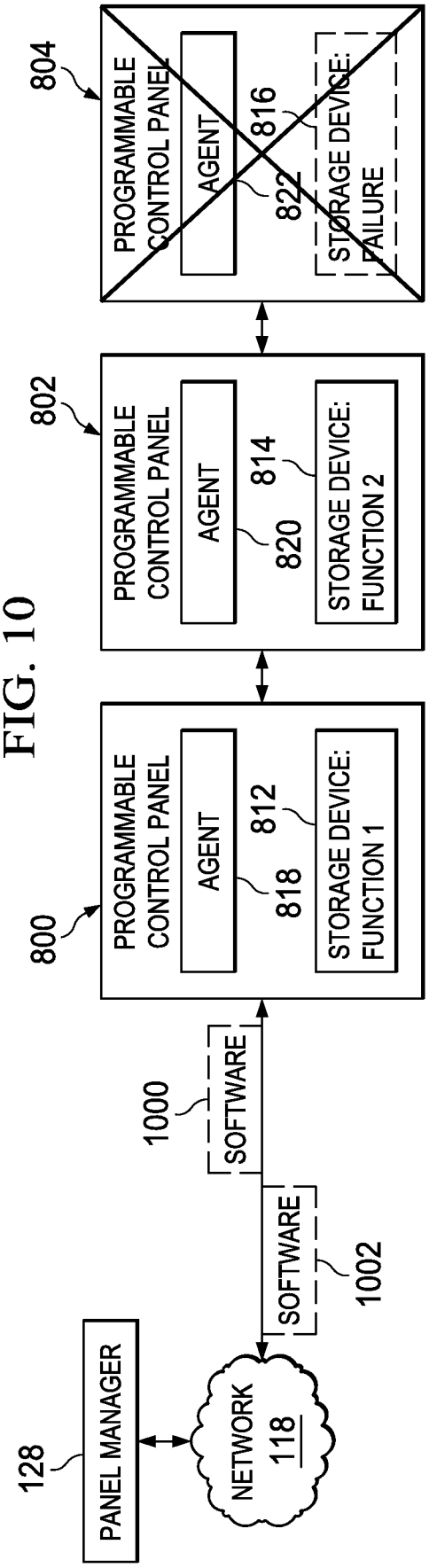
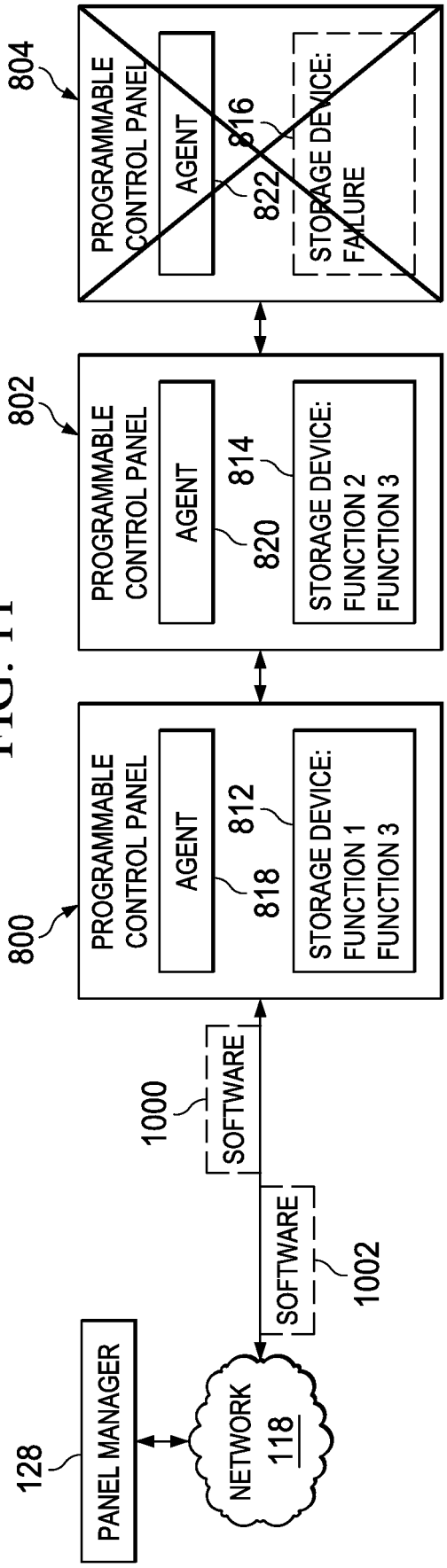

804
PROGRAMMABLE CONTROL PANEL
AGENT
816
822
STORAGE DEVICE: FAILURE
802
PROGRAMMABLE CONTROL PANEL
AGENT
814
820
STORAGE DEVICE: FUNCTION 2
800
PROGRAMMABLE CONTROL PANEL
AGENT
812
818
STORAGE DEVICE: FUNCTION 1
1000
SOFTWARE
SOFTWARE
1002
128
PANEL MANAGER
NETWORK 118

FIG. 11


804
PROGRAMMABLE CONTROL PANEL
AGENT
816
822
STORAGE DEVICE: FAILURE
802
PROGRAMMABLE CONTROL PANEL
AGENT
814
820
STORAGE DEVICE: FUNCTION 2 FUNCTION 3
800
PROGRAMMABLE CONTROL PANEL
AGENT
812
818
STORAGE DEVICE: FUNCTION 1 FUNCTION 3
1000
SOFTWARE
SOFTWARE
1002
128
PANEL MANAGER
NETWORK 118

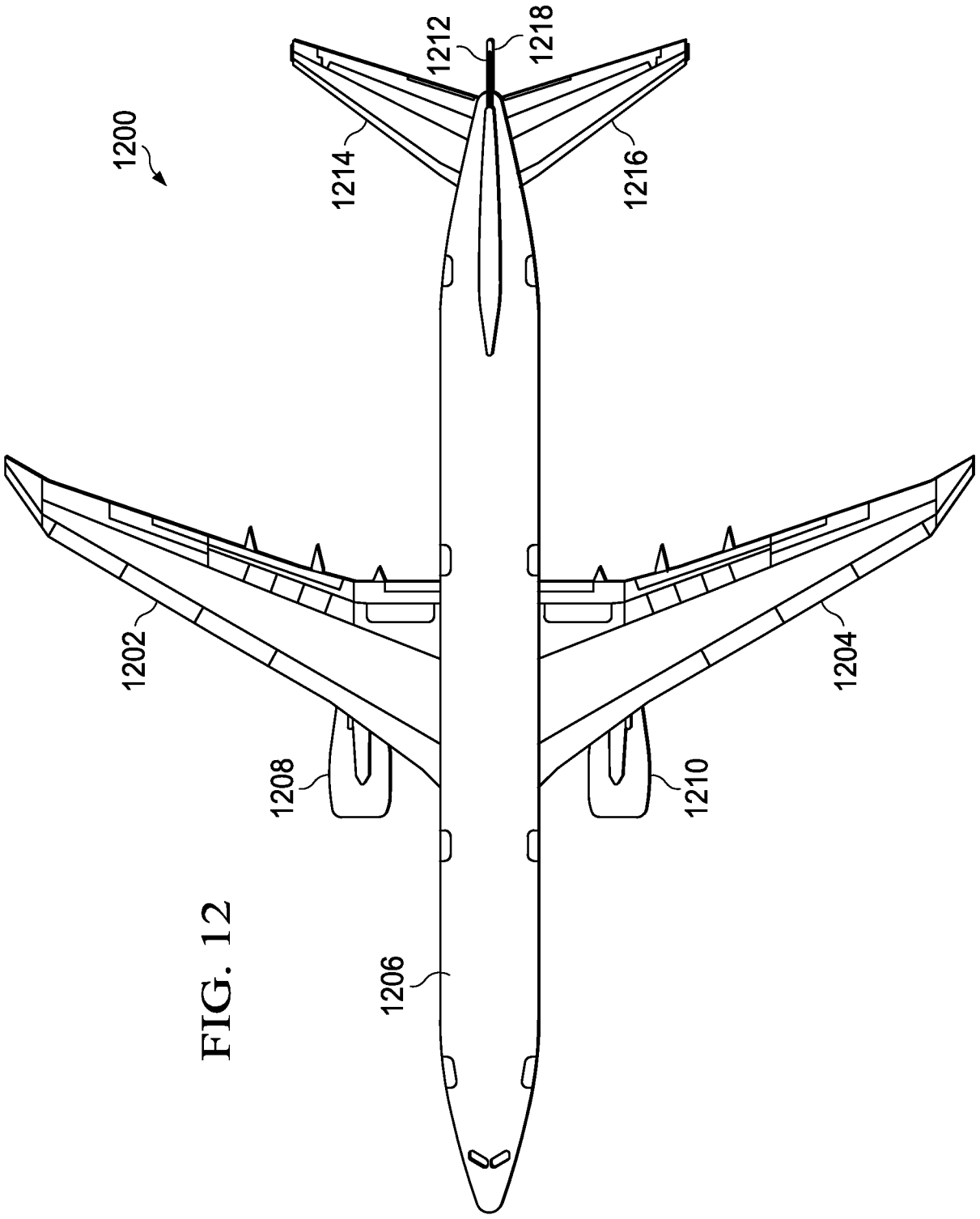
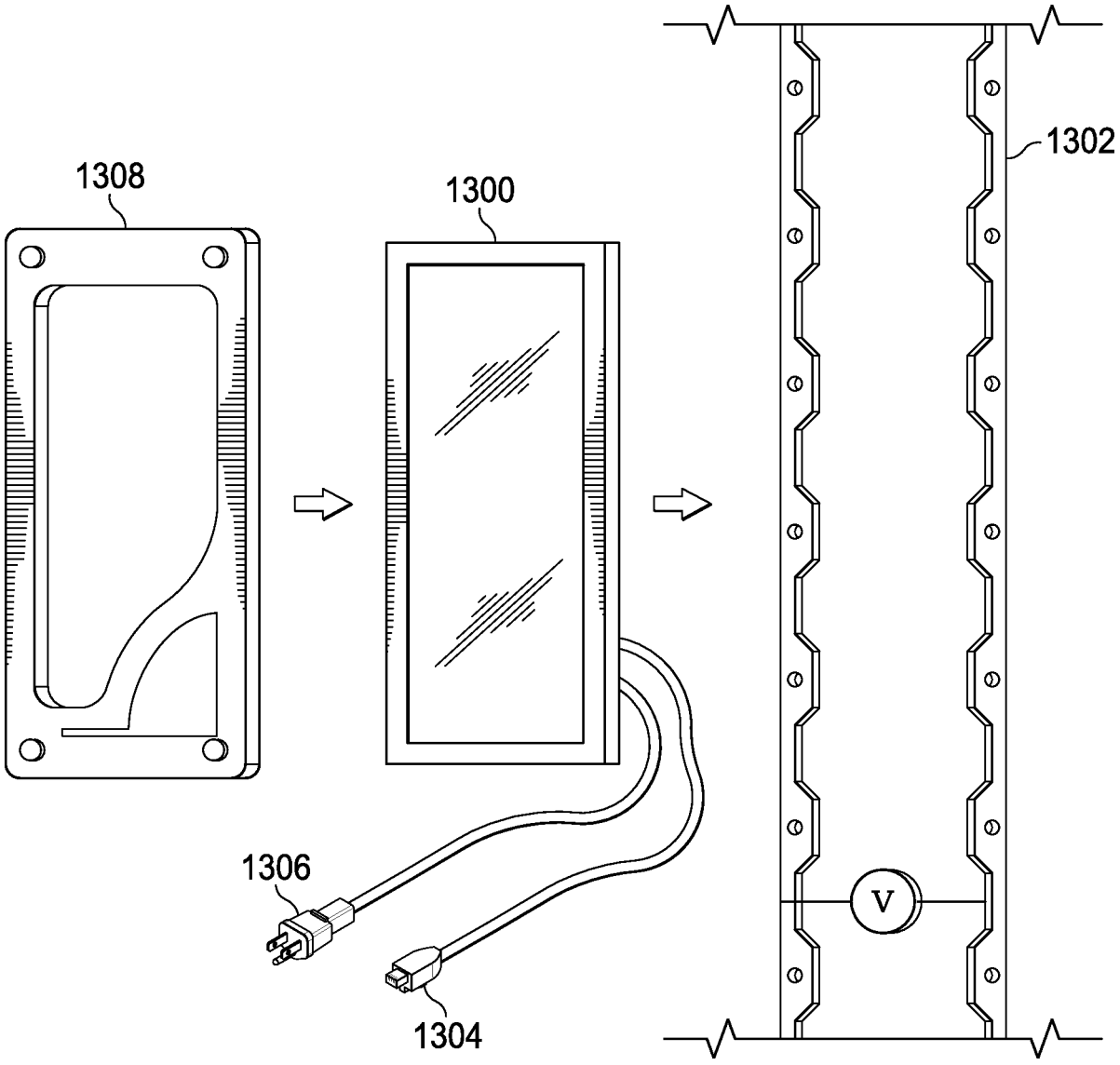


FIG. 12

FIG. 13



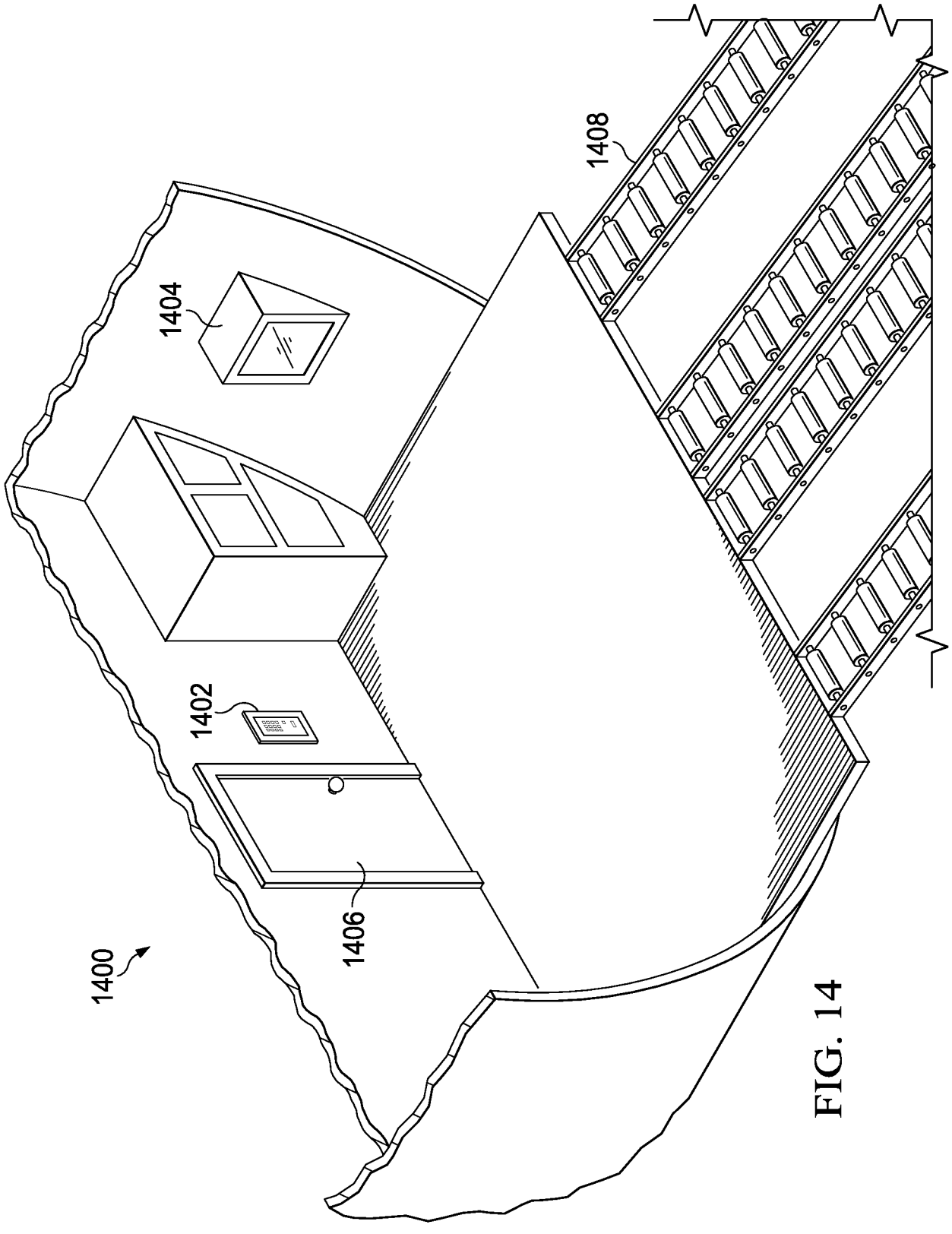


FIG. 14

FIG. 15

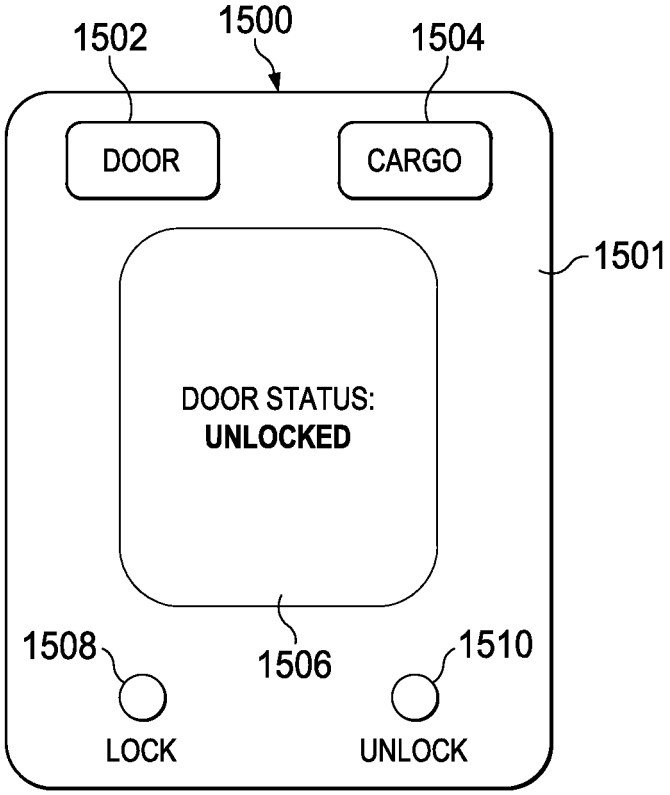
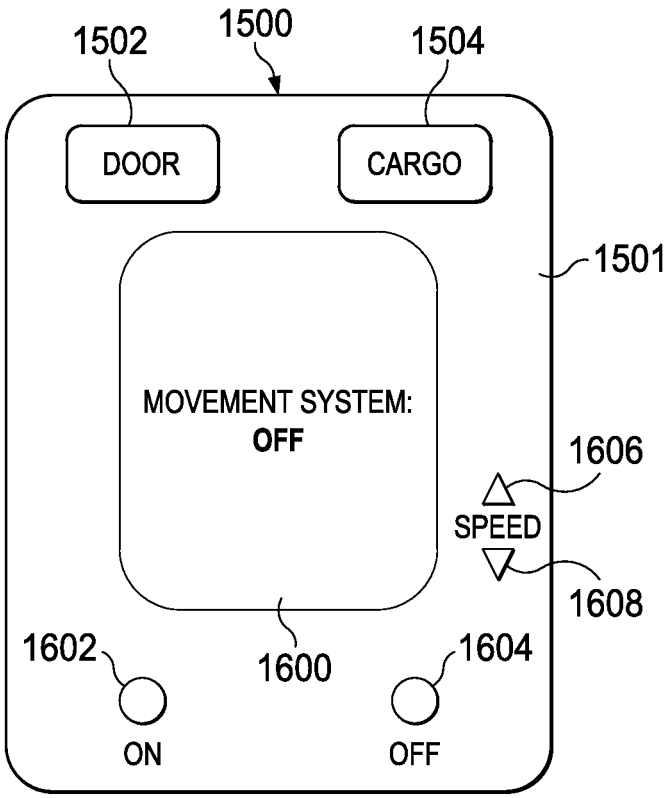

1502
1500
1504
DOOR
CARGO
1501
DOOR STATUS:
UNLOCKED
1508
1506
1510
LOCK
UNLOCK

FIG. 16


1502
1500
1504
DOOR
CARGO
1501
MOVEMENT SYSTEM:
OFF
1606
SPEED
1608
1602
1600
1604
ON
OFF

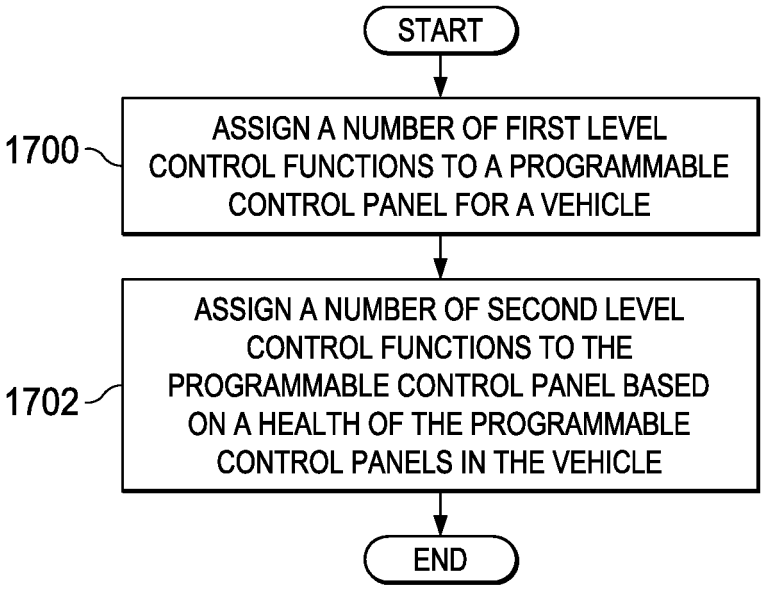

START
1700
ASSIGN A NUMBER OF FIRST LEVEL CONTROL FUNCTIONS TO A PROGRAMMABLE CONTROL PANEL FOR A VEHICLE
1702
ASSIGN A NUMBER OF SECOND LEVEL CONTROL FUNCTIONS TO THE PROGRAMMABLE CONTROL PANEL BASED ON A HEALTH OF THE PROGRAMMABLE CONTROL PANELS IN THE VEHICLE
END

FIG. 17

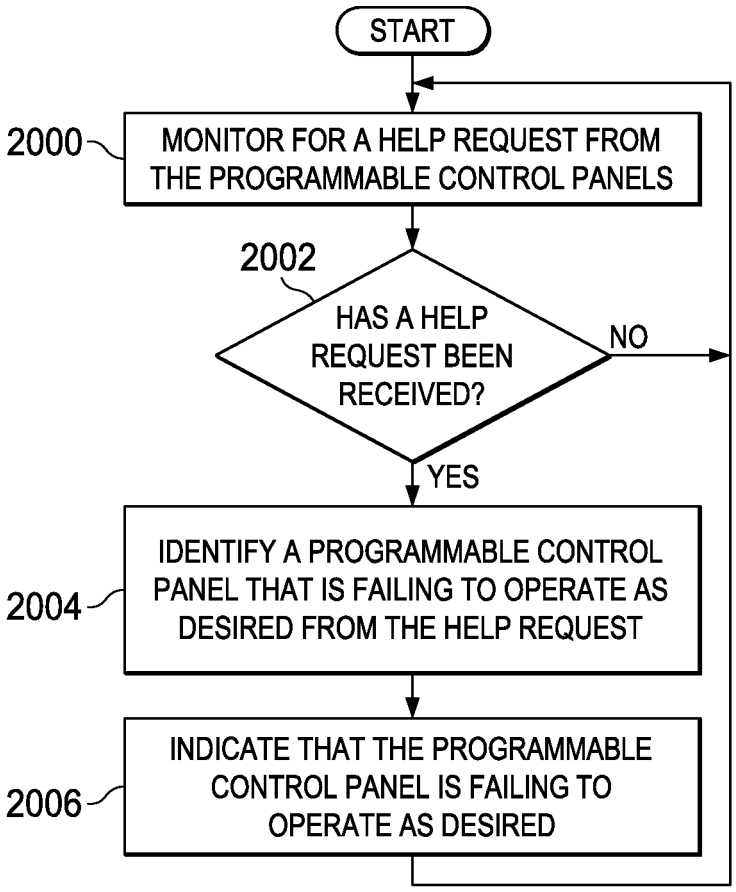

START
2000
MONITOR FOR A HELP REQUEST FROM THE PROGRAMMABLE CONTROL PANELS
2002
HAS A HELP REQUEST BEEN RECEIVED?
NO
YES
2004
IDENTIFY A PROGRAMMABLE CONTROL PANEL THAT IS FAILING TO OPERATE AS DESIRED FROM THE HELP REQUEST
2006
INDICATE THAT THE PROGRAMMABLE CONTROL PANEL IS FAILING TO OPERATE AS DESIRED

FIG. 20

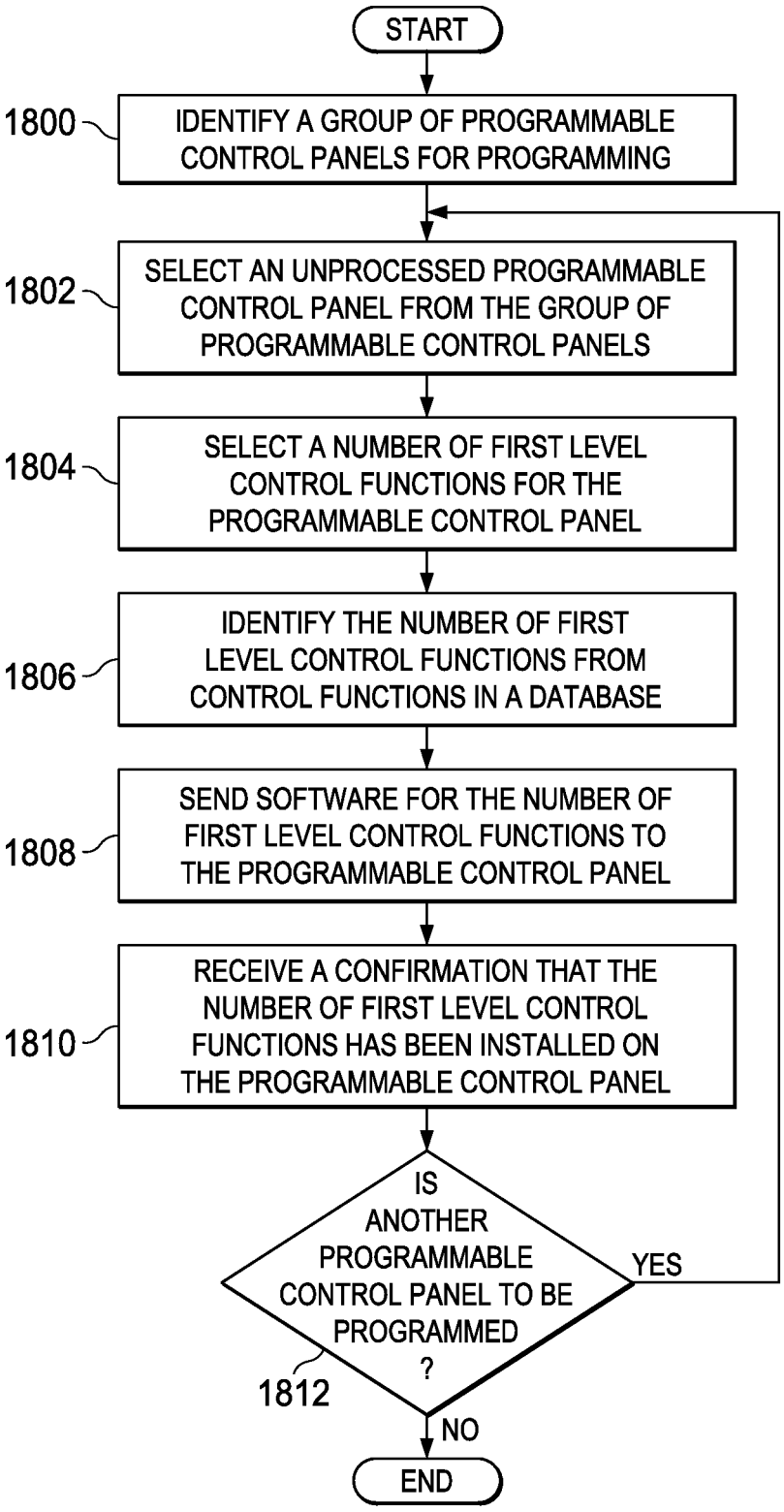

START
1800
IDENTIFY A GROUP OF PROGRAMMABLE CONTROL PANELS FOR PROGRAMMING
1802
SELECT AN UNPROCESSED PROGRAMMABLE CONTROL PANEL FROM THE GROUP OF PROGRAMMABLE CONTROL PANELS
1804
SELECT A NUMBER OF FIRST LEVEL CONTROL FUNCTIONS FOR THE PROGRAMMABLE CONTROL PANEL
1806
IDENTIFY THE NUMBER OF FIRST LEVEL CONTROL FUNCTIONS FROM CONTROL FUNCTIONS IN A DATABASE
1808
SEND SOFTWARE FOR THE NUMBER OF FIRST LEVEL CONTROL FUNCTIONS TO THE PROGRAMMABLE CONTROL PANEL
1810
RECEIVE A CONFIRMATION THAT THE NUMBER OF FIRST LEVEL CONTROL FUNCTIONS HAS BEEN INSTALLED ON THE PROGRAMMABLE CONTROL PANEL
IS ANOTHER PROGRAMMABLE CONTROL PANEL TO BE PROGRAMMED ?
1812
YES
NO
END

FIG. 18

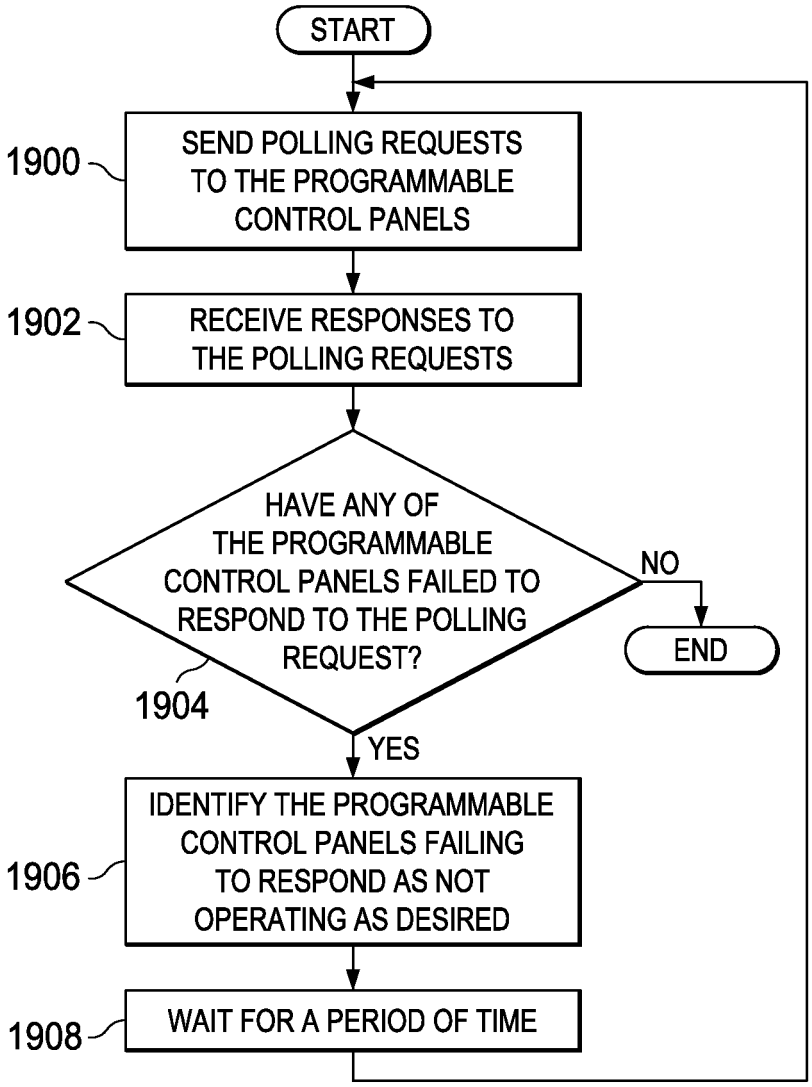

START
1900
SEND POLLING REQUESTS TO THE PROGRAMMABLE CONTROL PANELS
1902
RECEIVE RESPONSES TO THE POLLING REQUESTS
HAVE ANY OF THE PROGRAMMABLE CONTROL PANELS FAILED TO RESPOND TO THE POLLING REQUEST?
1904
NO
END
YES
1906
IDENTIFY THE PROGRAMMABLE CONTROL PANELS FAILING TO RESPOND AS NOT OPERATING AS DESIRED
1908
WAIT FOR A PERIOD OF TIME

FIG. 19

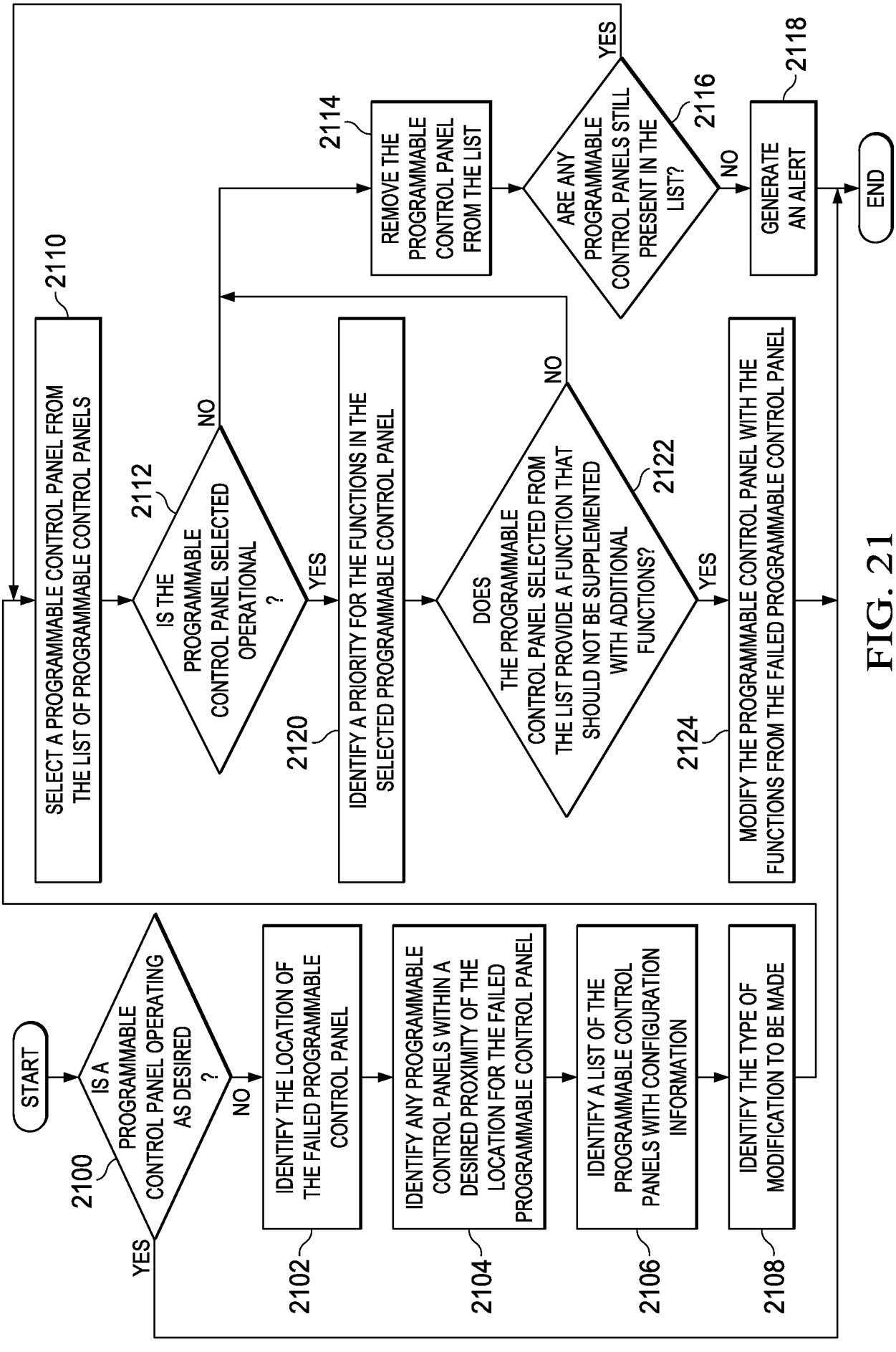

START
IS A PROGRAMMABLE CONTROL PANEL OPERATING AS DESIRED ?
2100
YES
NO
IDENTIFY THE LOCATION OF THE FAILED PROGRAMMABLE CONTROL PANEL
2102
IDENTIFY ANY PROGRAMMABLE CONTROL PANELS WITHIN A DESIRED PROXIMITY OF THE LOCATION FOR THE FAILED PROGRAMMABLE CONTROL PANEL
2104
IDENTIFY A LIST OF THE PROGRAMMABLE CONTROL PANELS WITH CONFIGURATION INFORMATION
2106
IDENTIFY THE TYPE OF MODIFICATION TO BE MADE
2108
SELECT A PROGRAMMABLE CONTROL PANEL FROM THE LIST OF PROGRAMMABLE CONTROL PANELS
2110
IS THE PROGRAMMABLE CONTROL PANEL SELECTED OPERATIONAL ?
2112
NO
YES
IDENTIFY A PRIORITY FOR THE FUNCTIONS IN THE SELECTED PROGRAMMABLE CONTROL PANEL
2120
DOES THE PROGRAMMABLE CONTROL PANEL SELECTED FROM THE LIST PROVIDE A FUNCTION THAT SHOULD NOT BE SUPPLEMENTED WITH ADDITIONAL FUNCTIONS?
2122
NO
YES
MODIFY THE PROGRAMMABLE CONTROL PANEL WITH THE FUNCTIONS FROM THE FAILED PROGRAMMABLE CONTROL PANEL
2124
REMOVE THE PROGRAMMABLE CONTROL PANEL FROM THE LIST
2114
ARE ANY PROGRAMMABLE CONTROL PANELS STILL PRESENT IN THE LIST?
2116
YES
NO
GENERATE AN ALERT
2118
END

FIG. 21

FIG. 22

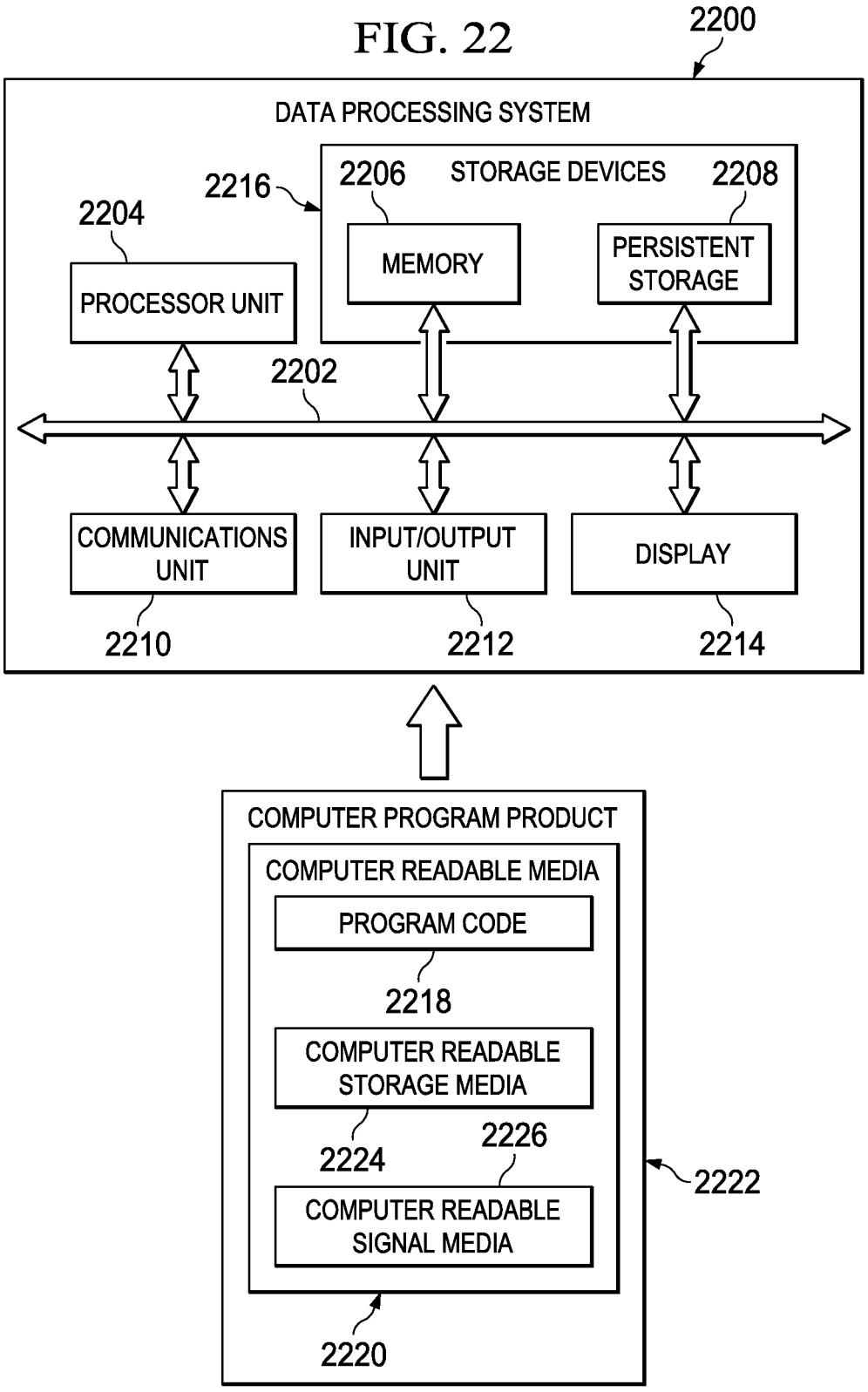

2200
DATA PROCESSING SYSTEM
2216
2206
STORAGE DEVICES
2208
2204
MEMORY
PERSISTENT STORAGE
PROCESSOR UNIT
2202
COMMUNICATIONS UNIT
INPUT/OUTPUT UNIT
DISPLAY
2210
2212
2214
COMPUTER PROGRAM PRODUCT
COMPUTER READABLE MEDIA
PROGRAM CODE
2218
COMPUTER READABLE STORAGE MEDIA
2224
2226
COMPUTER READABLE SIGNAL MEDIA
2222
2220

FIG. 23

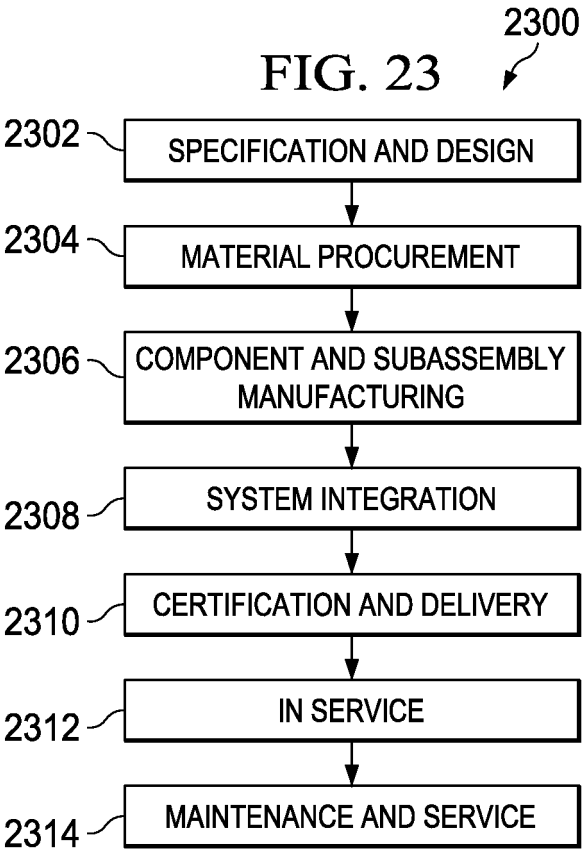
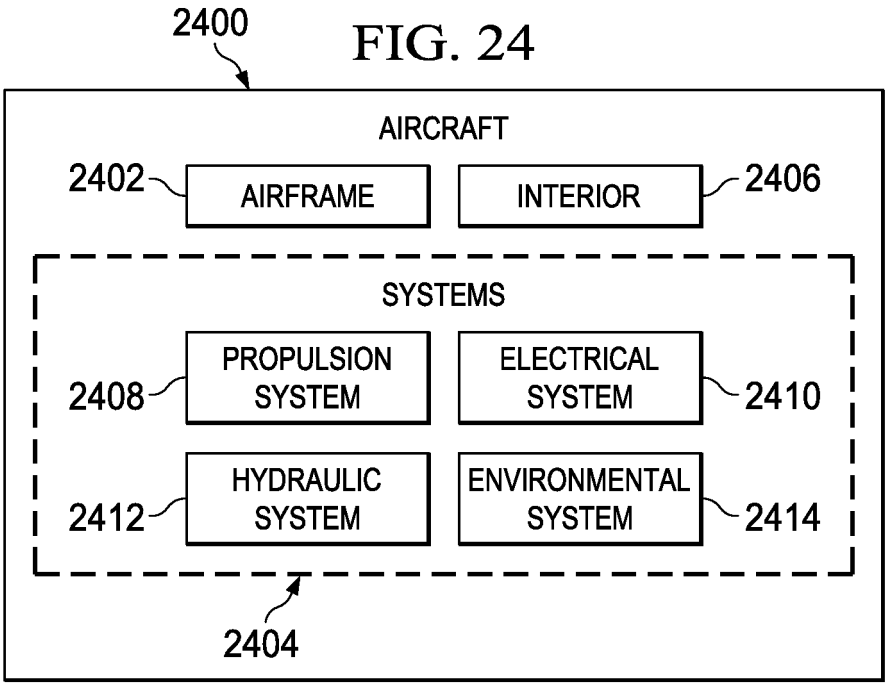

2300
2302
SPECIFICATION AND DESIGN
2304
MATERIAL PROCUREMENT
2306
COMPONENT AND SUBASSEMBLY MANUFACTURING
2308
SYSTEM INTEGRATION
2310
CERTIFICATION AND DELIVERY
2312
IN SERVICE
2314
MAINTENANCE AND SERVICE

FIG. 24


2400
AIRCRAFT
2402
AIRFRAME
INTERIOR
2406
SYSTEMS
2408
PROPULSION SYSTEM
ELECTRICAL SYSTEM
2410
2412
HYDRAULIC SYSTEM
ENVIRONMENTAL SYSTEM
2414
2404