FIG. 1

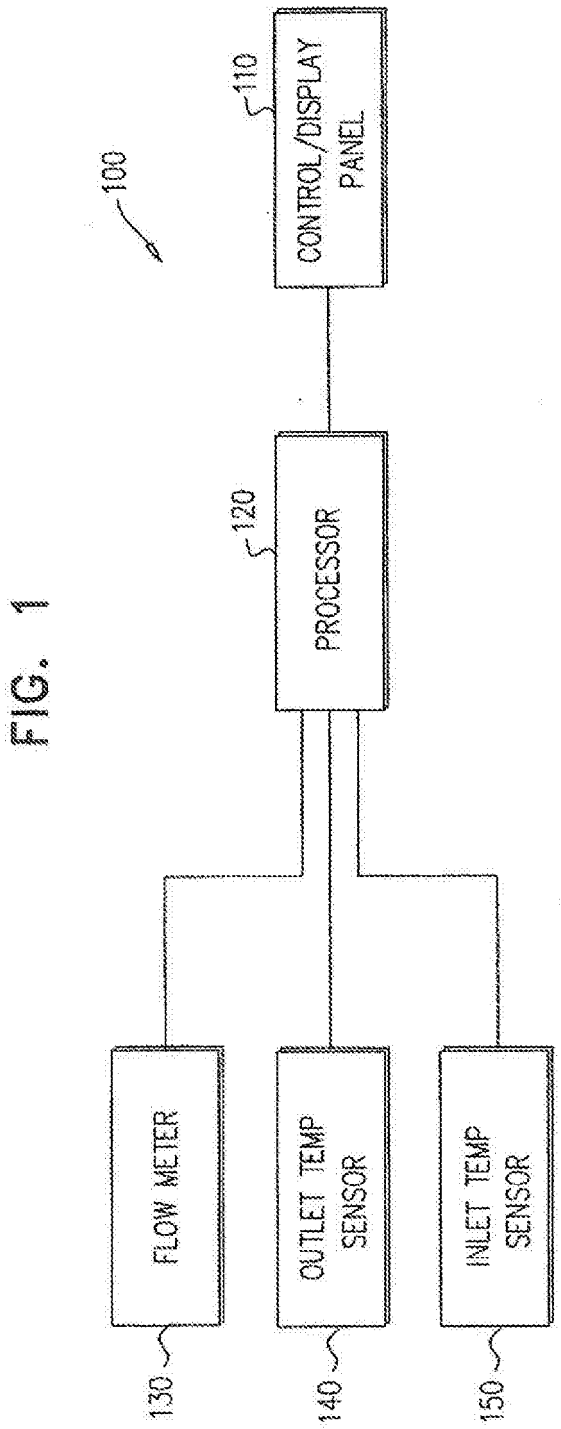

100
110
CONTROL/DISPLAY PANEL
120
PROCESSOR
FLOW METER
OUTLET TEMP SENSOR
INLET TEMP SENSOR
130
140
150

FIG. 2

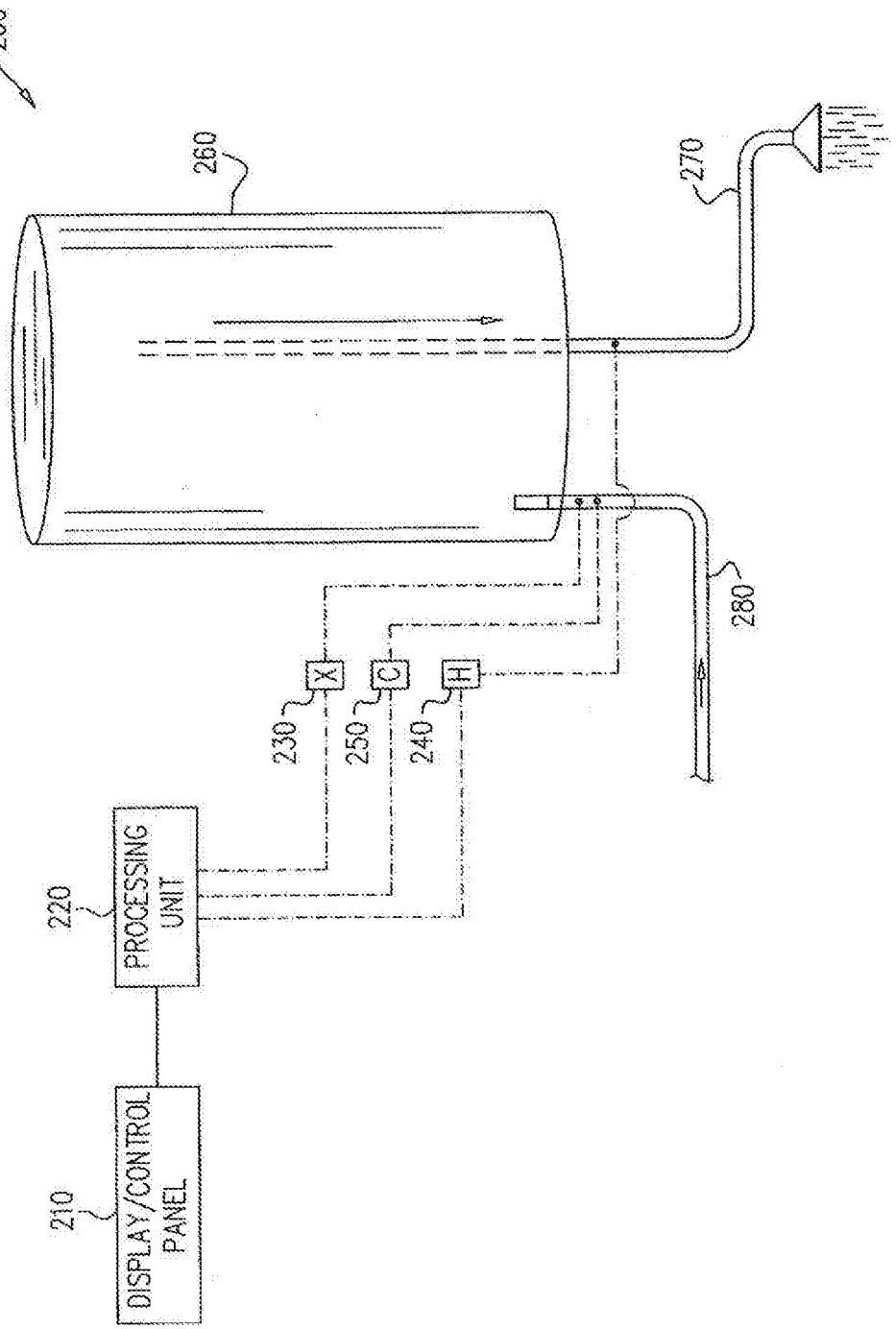

200
260
270
280
X
C
H
230
250
240
220
PROCESSING UNIT
210
DISPLAY/CONTROL PANEL

FIG. 3

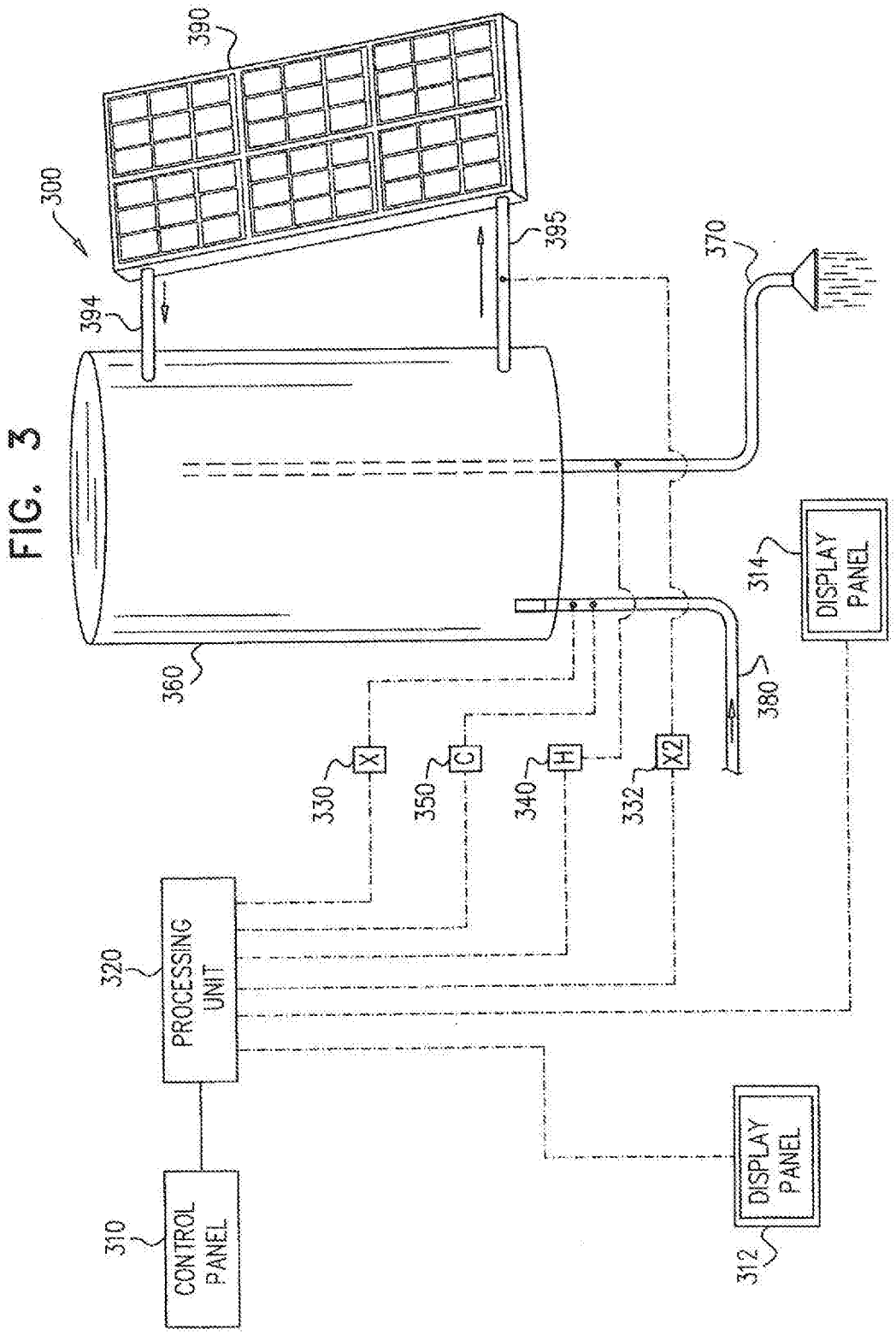

390
300
395
370
394
360
380
314
DISPLAY PANEL
330
X
350
C
340
H
332
X2
320
PROCESSING UNIT
310
CONTROL PANEL
312
DISPLAY PANEL

FIG. 4

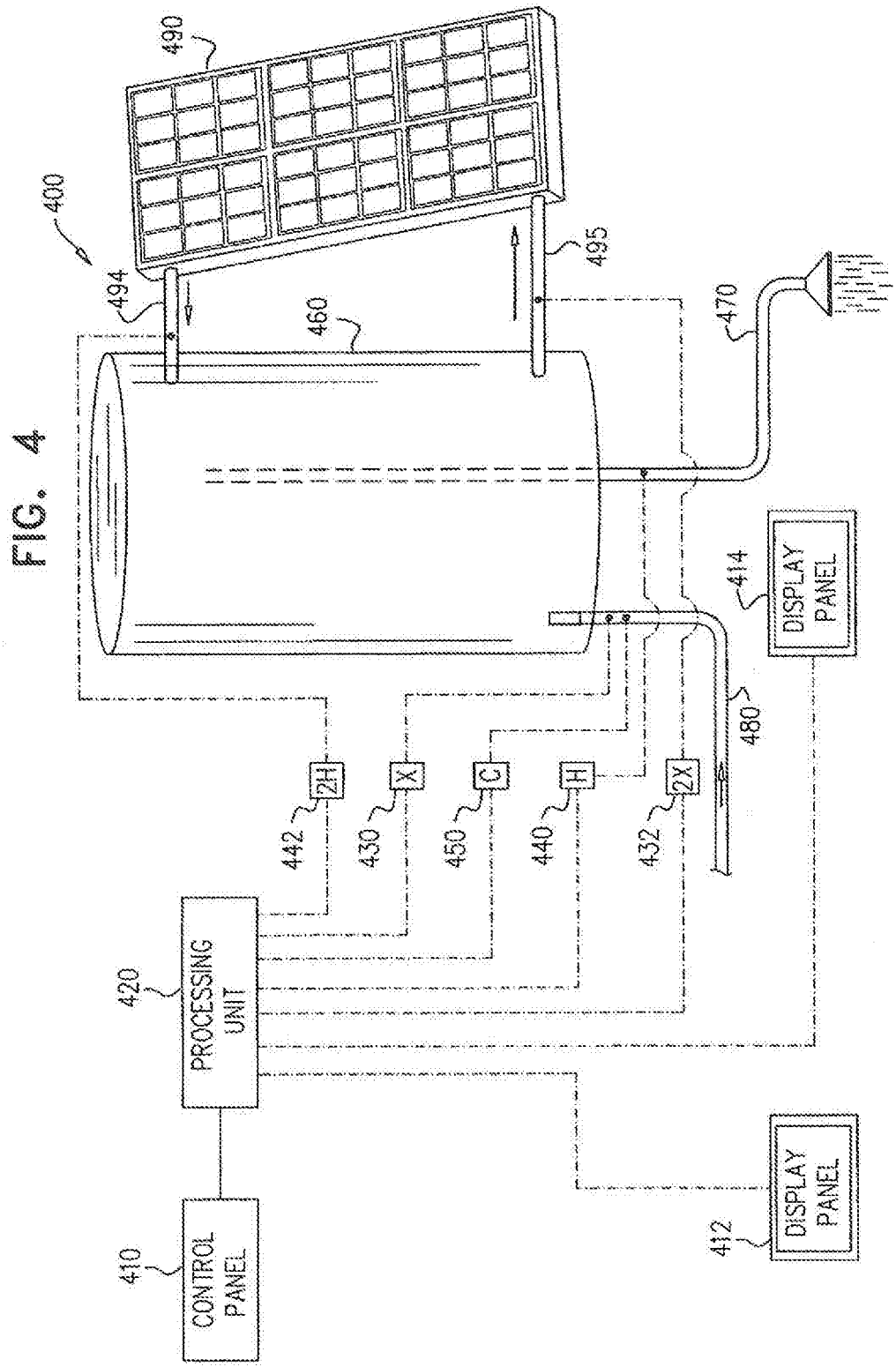

400
490
494
495
460
470
414
DISPLAY PANEL
480
2H
X
C
H
2X
442
430
450
440
432
420
PROCESSING UNIT
410
CONTROL PANEL
412
DISPLAY PANEL

FIG. 5

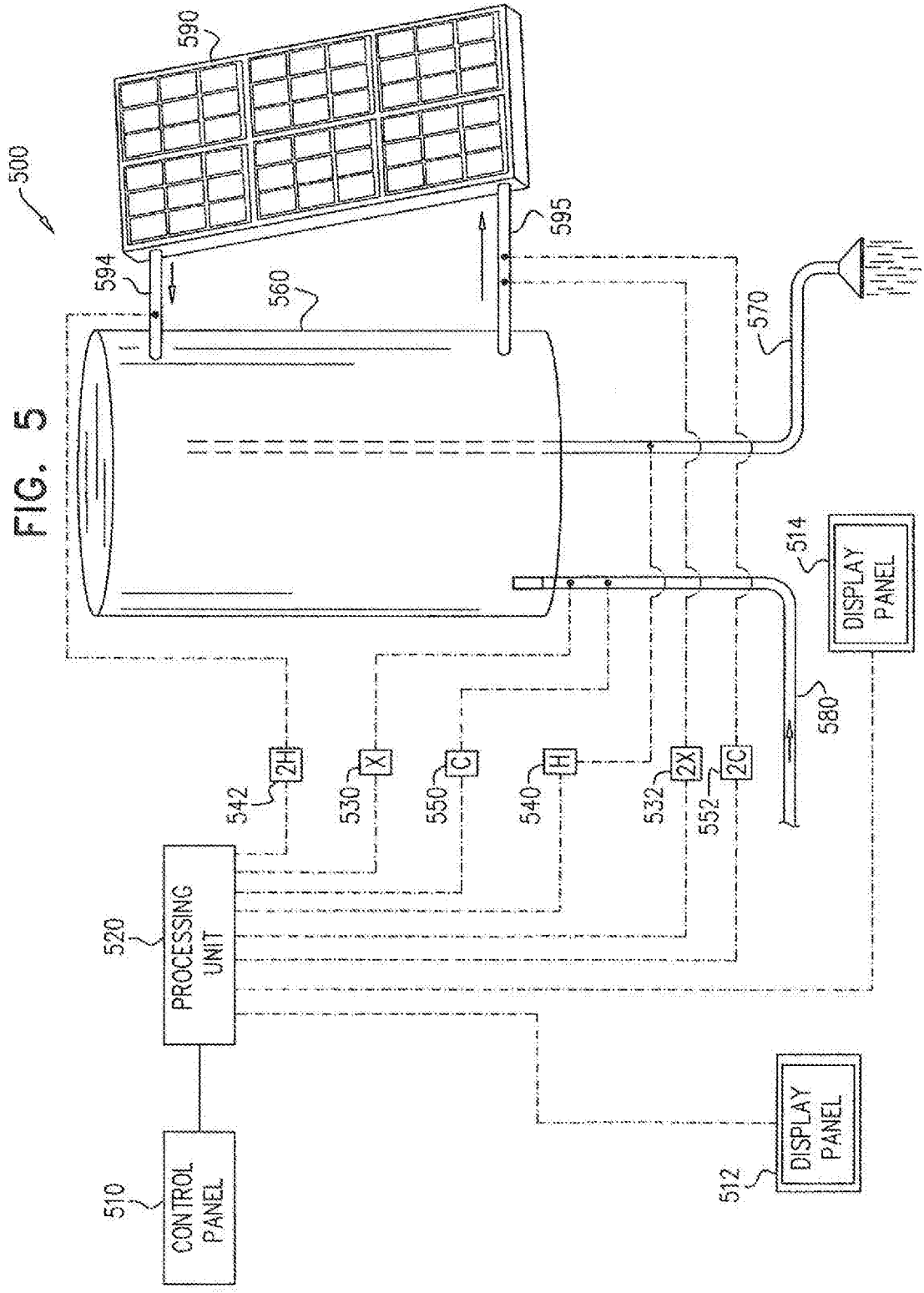

500
590
595
594
560
570
514
DISPLAY PANEL
580
542
2H
530
X
550
C
540
H
532
2X
552
2C
520
PROCESSING UNIT
510
CONTROL PANEL
512
DISPLAY PANEL

FIG. 6

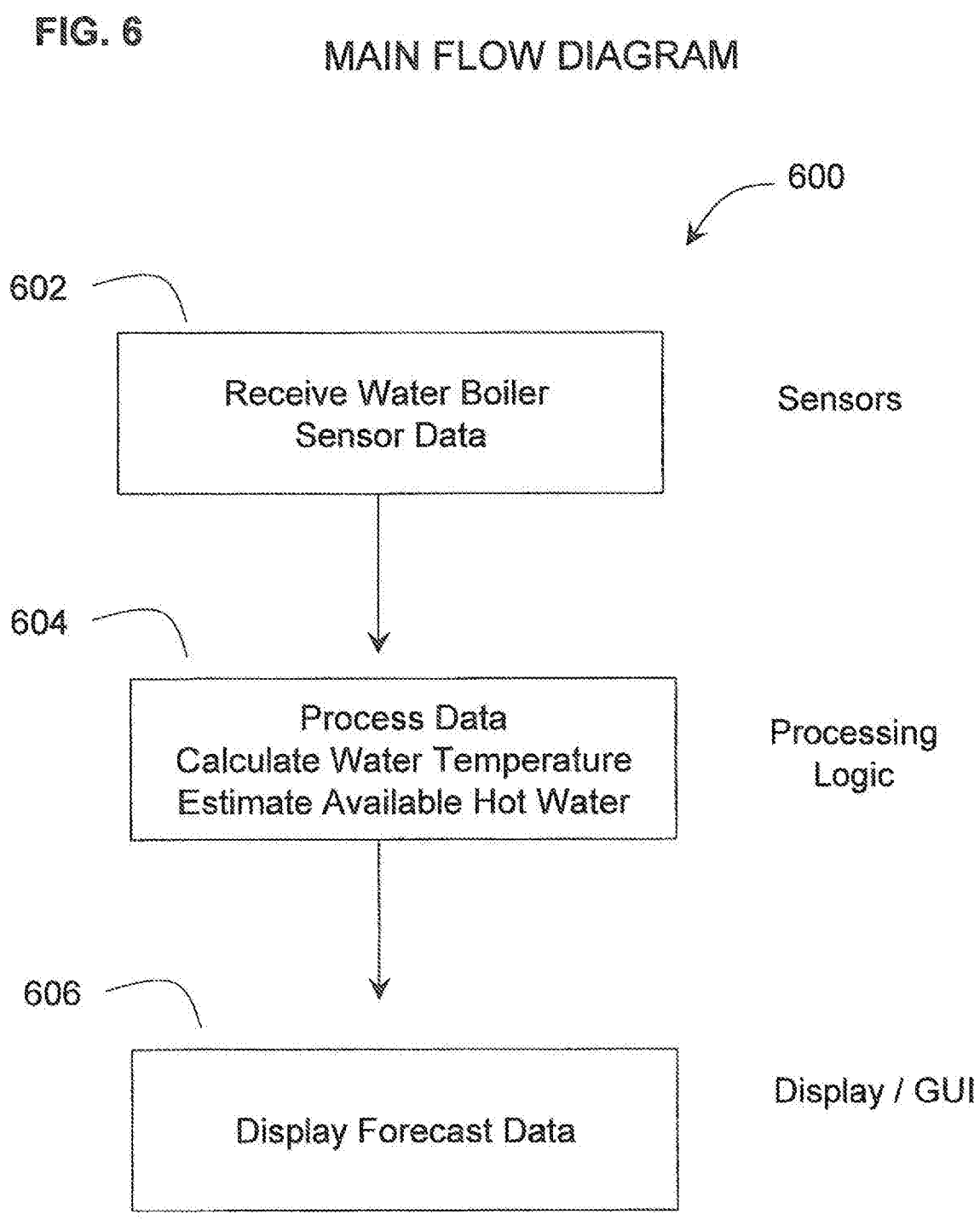

MAIN FLOW DIAGRAM
600
602
Receive Water Boiler Sensor Data
Sensors
604
Process Data
Calculate Water Temperature
Estimate Available Hot Water
Processing Logic
606
Display Forecast Data
Display / GUI

FIG. 7

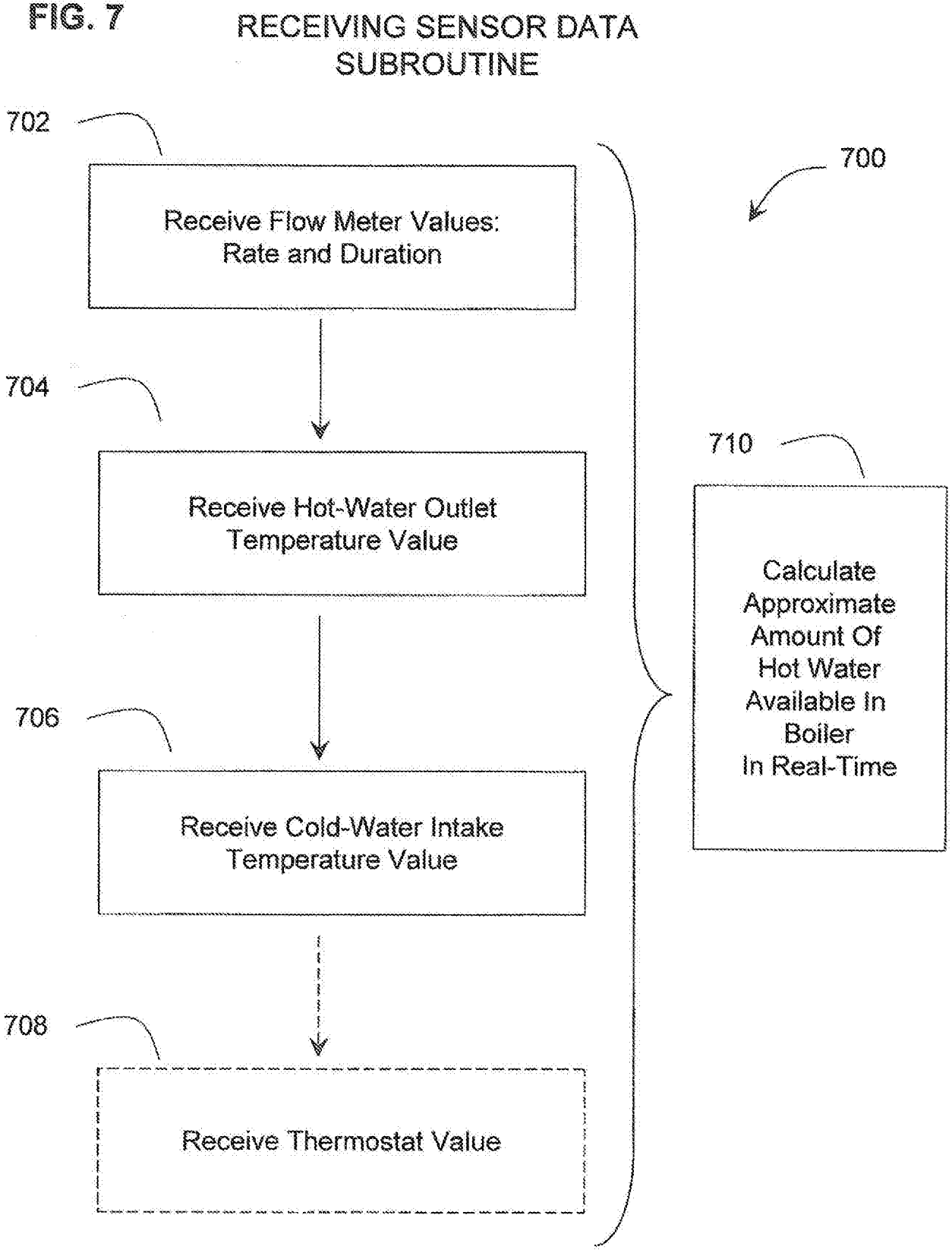
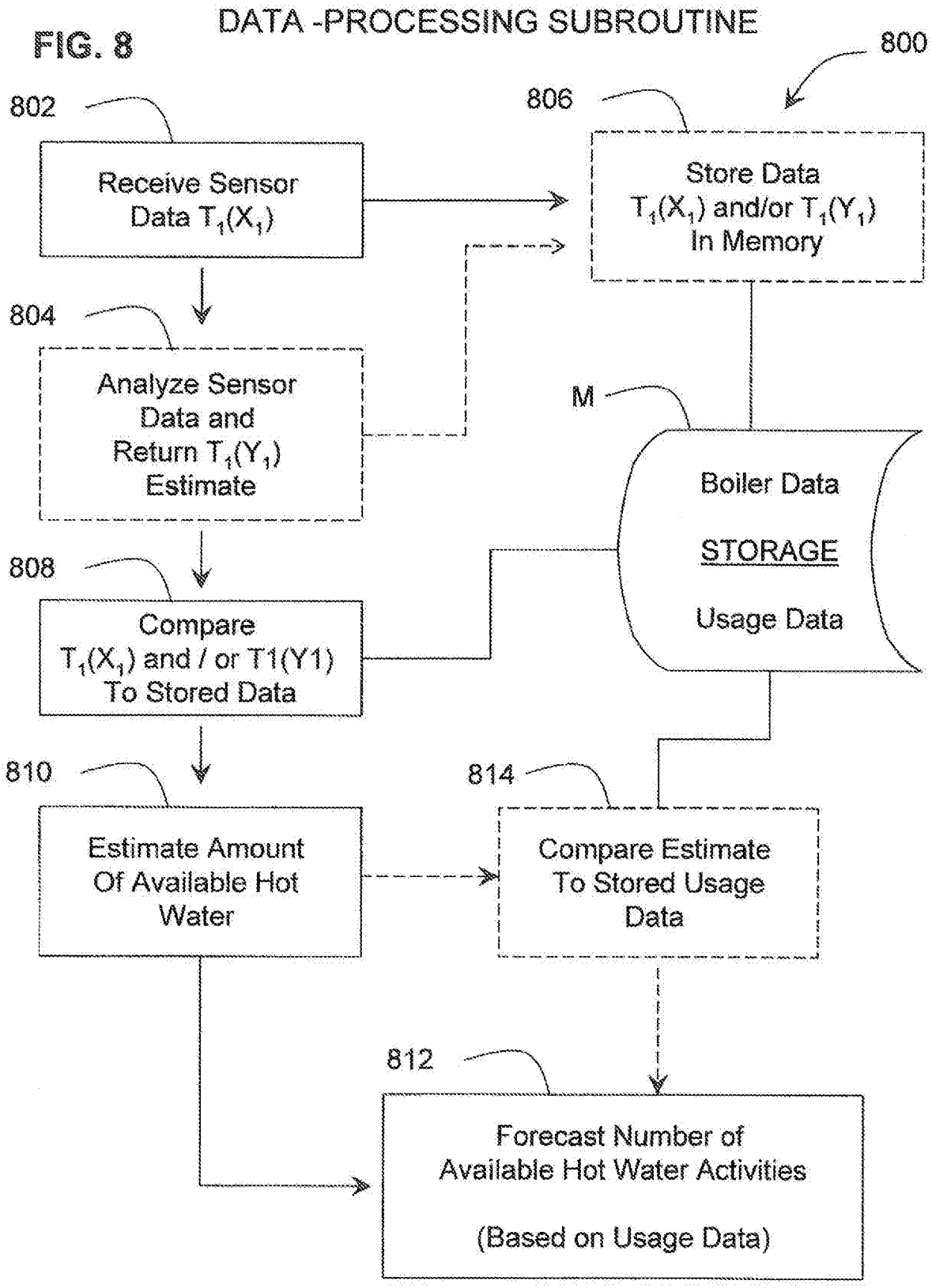

RECEIVING SENSOR DATA SUBROUTINE
700
702
Receive Flow Meter Values: Rate and Duration
704
Receive Hot-Water Outlet Temperature Value
706
Receive Cold-Water Intake Temperature Value
708
Receive Thermostat Value
710
Calculate Approximate Amount Of Hot Water Available In Boiler In Real-Time

FIG. 8


DATA -PROCESSING SUBROUTINE
800
802
Receive Sensor Data $T_1(X_1)$
804
Analyze Sensor Data and Return $T_1(Y_1)$ Estimate
806
Store Data $T_1(X_1)$ and/or $T_1(Y_1)$ In Memory
M
Boiler Data
STORAGE
Usage Data
808
Compare $T_1(X_1)$ and / or T1(Y1) To Stored Data
810
Estimate Amount Of Available Hot Water
814
Compare Estimate To Stored Usage Data
812
Forecast Number of Available Hot Water Activities
(Based on Usage Data)

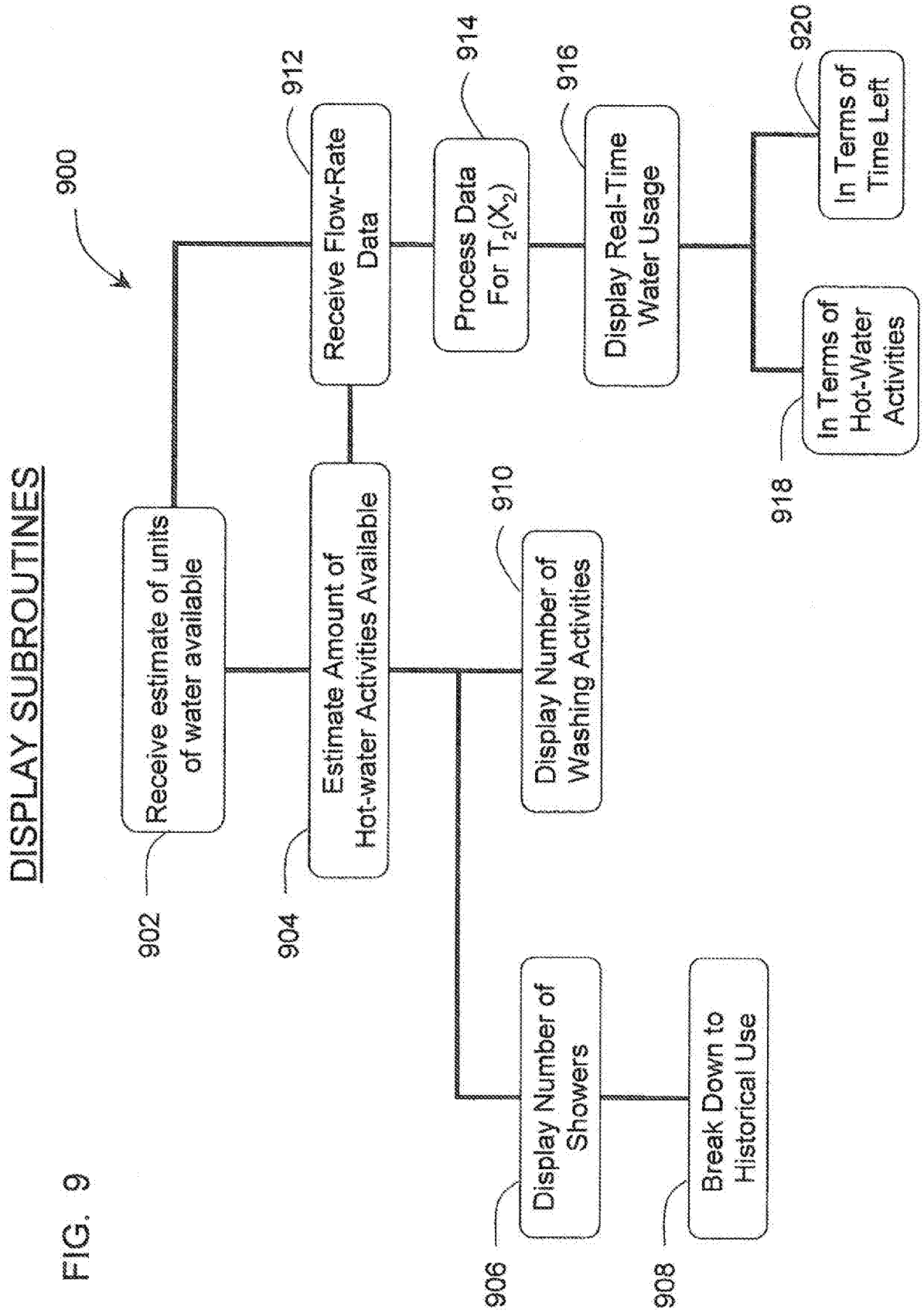

DISPLAY SUBROUTINES
900
Receive estimate of units of water available
902
Estimate Amount of Hot-water Activities Available
904
Display Number of Showers
906
Break Down to Historical Use
908
Display Number of Washing Activities
910
Receive Flow-Rate Data
912
Process Data For $T_2(X_2)$
914
Display Real-Time Water Usage
916
In Terms of Hot-Water Activities
918
In Terms of Time Left
920

FIG. 9

FIG. 10

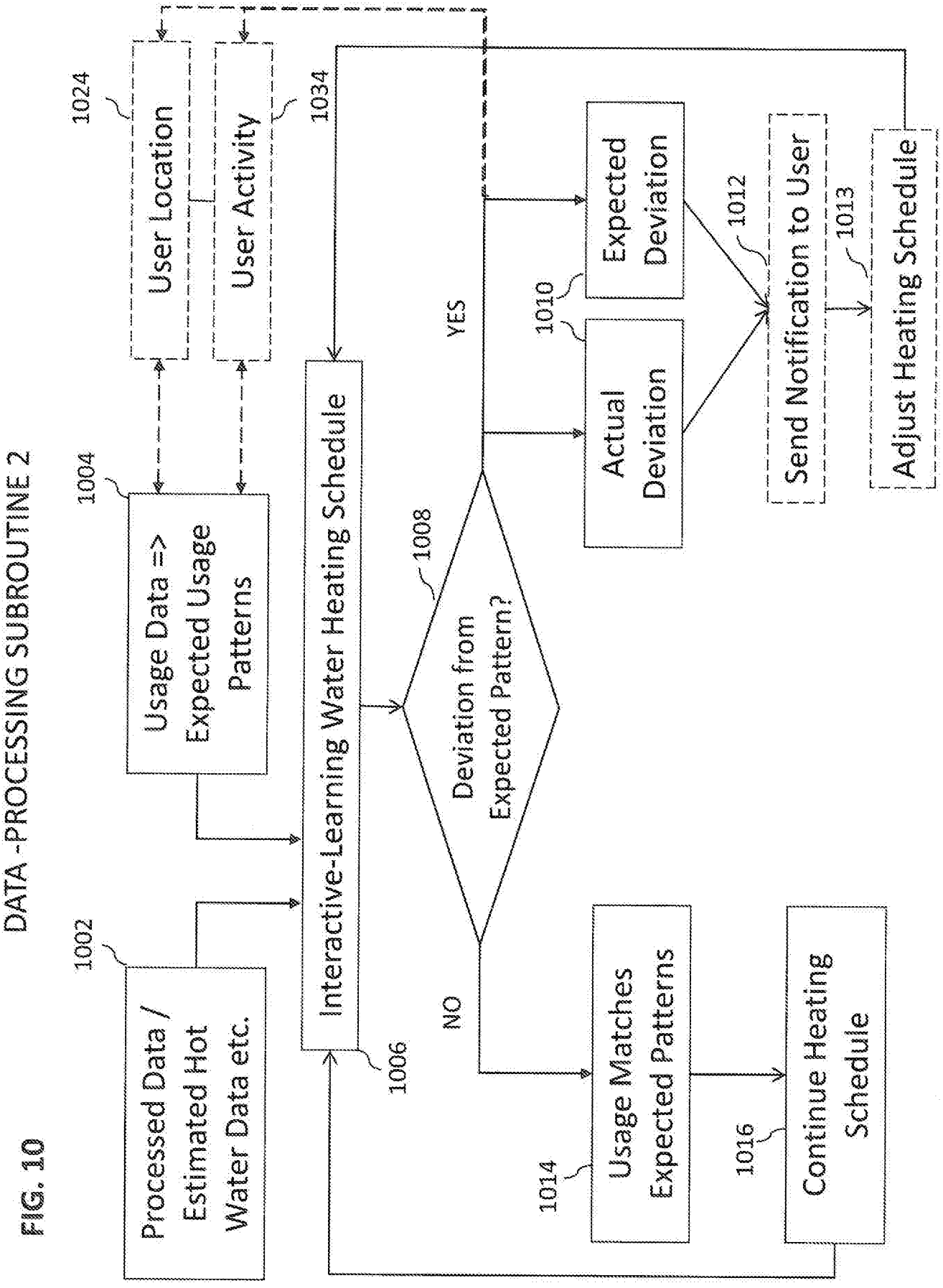
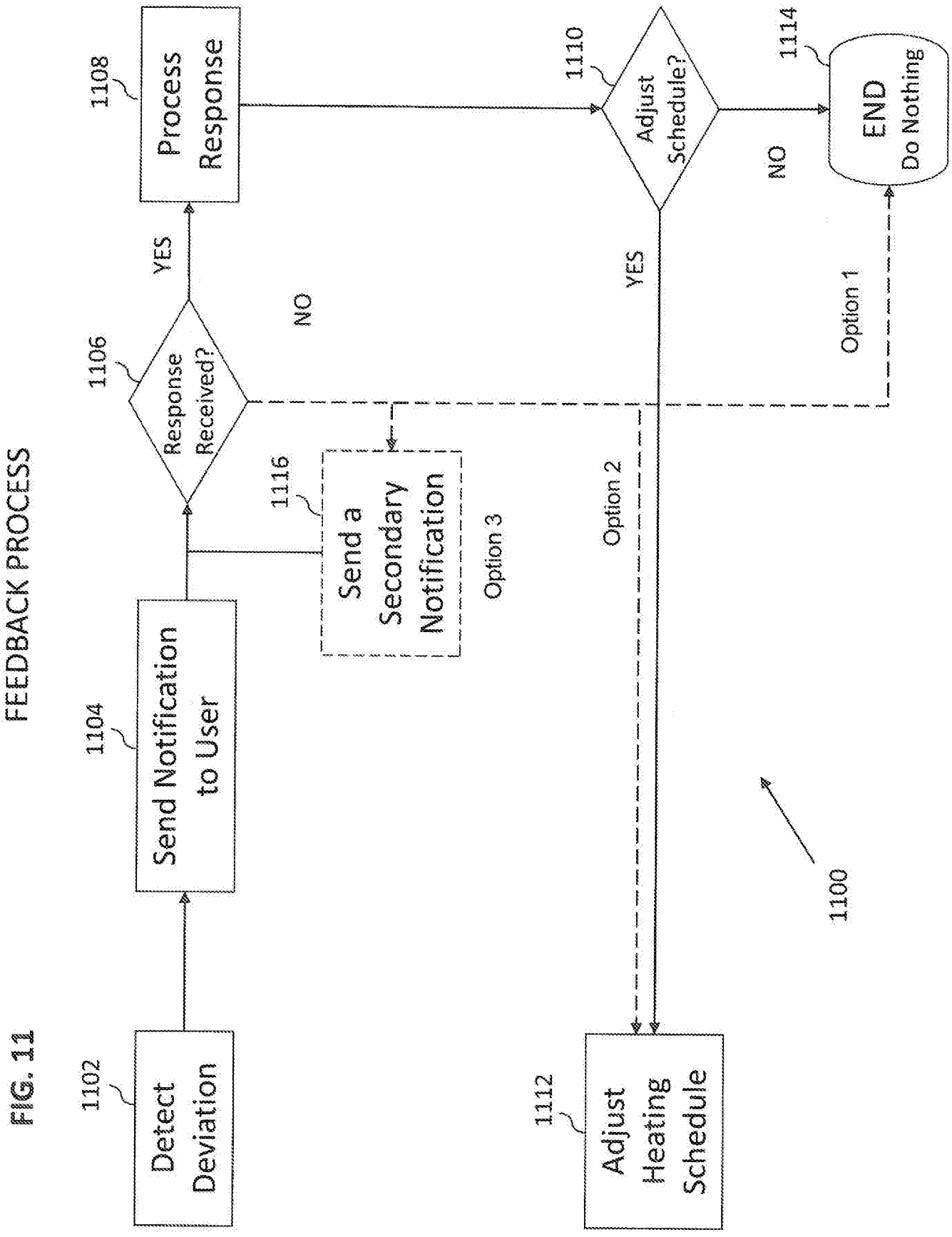

DATA -PROCESSING SUBROUTINE 2
1002
Processed Data / Estimated Hot Water Data etc.
1004
Usage Data => Expected Usage Patterns
1024
User Location
User Activity
1034
Interactive-Learning Water Heating Schedule
1006
1008
Deviation from Expected Pattern?
YES
NO
1010
Expected Deviation
Actual Deviation
1012
Send Notification to User
1013
Adjust Heating Schedule
1014
Usage Matches Expected Patterns
1016
Continue Heating Schedule

FIG. 11


FEEDBACK PROCESS
1102
Detect Deviation
1104
Send Notification to User
1106
Response Received?
YES
NO
1108
Process Response
1110
Adjust Schedule?
YES
NO
1114
END
Do Nothing
Option 1
1116
Send a Secondary Notification
Option 3
Option 2
1112
Adjust Heating Schedule
1100

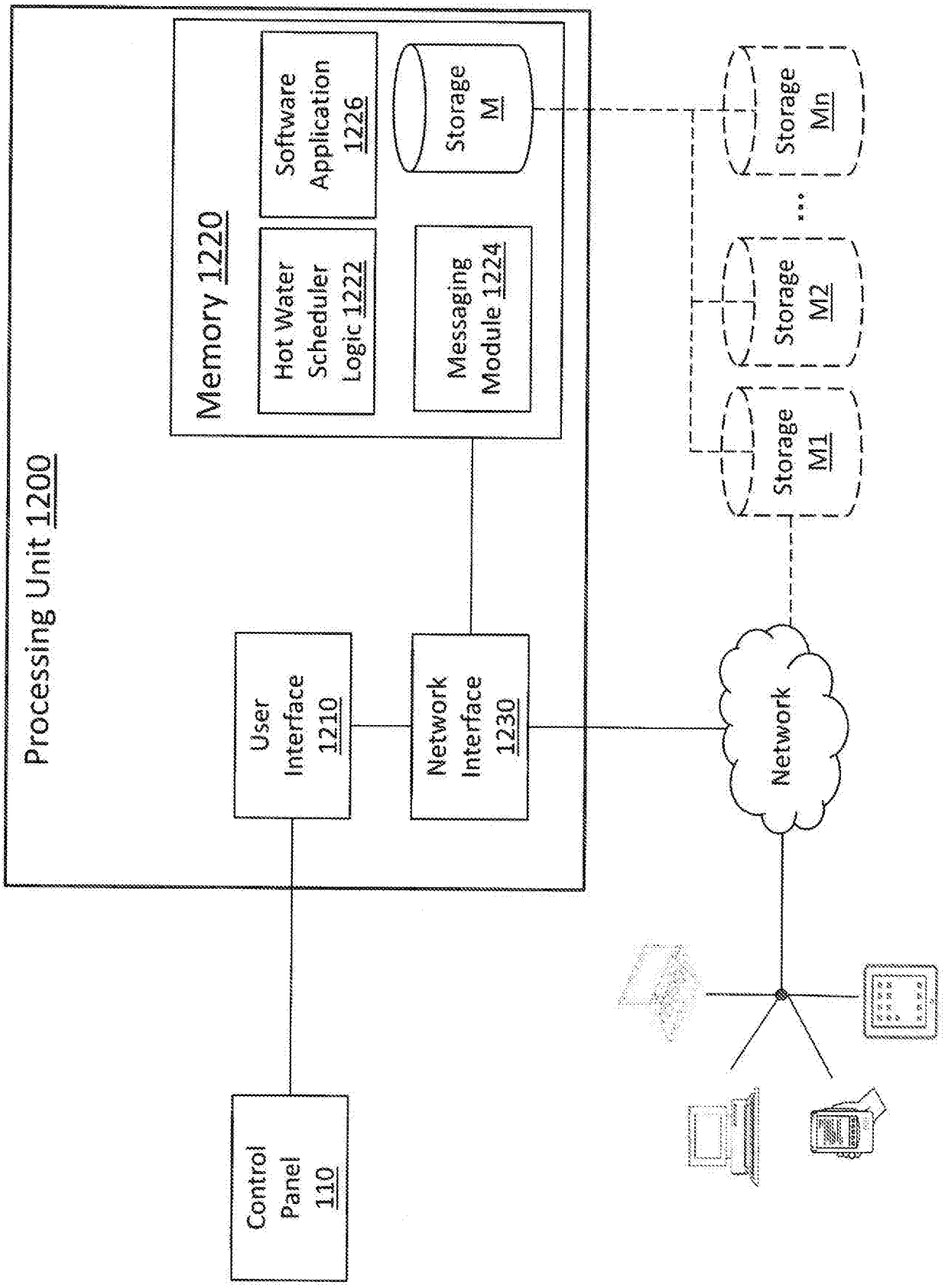

Processing Unit 1200
Memory 1220
Software Application 1226
Storage M
Hot Water Scheduler Logic 1222
Messaging Module 1224
User Interface 1210
Network Interface 1230
Control Panel 110
Storage Mn
Storage M2
Storage M1
Network

FIG. 12