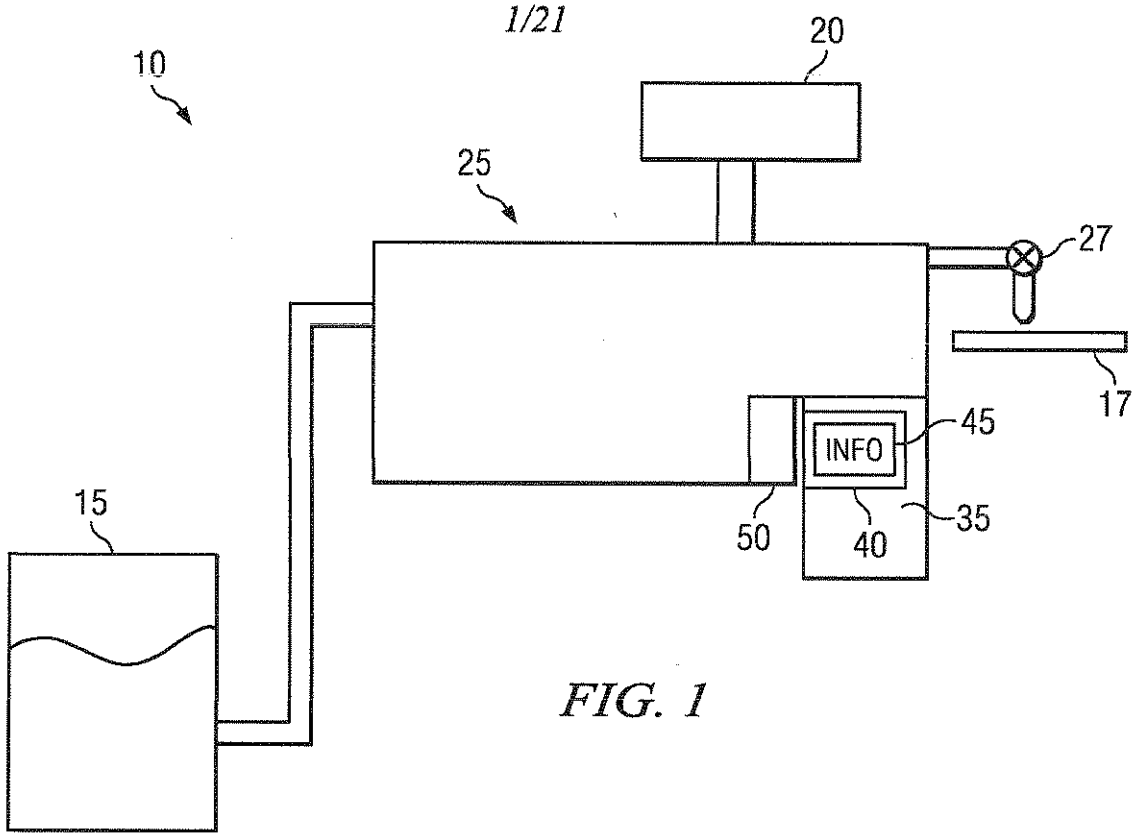

10
20
25
27
17
45
INFO
15
50
40
35

FIG. 1

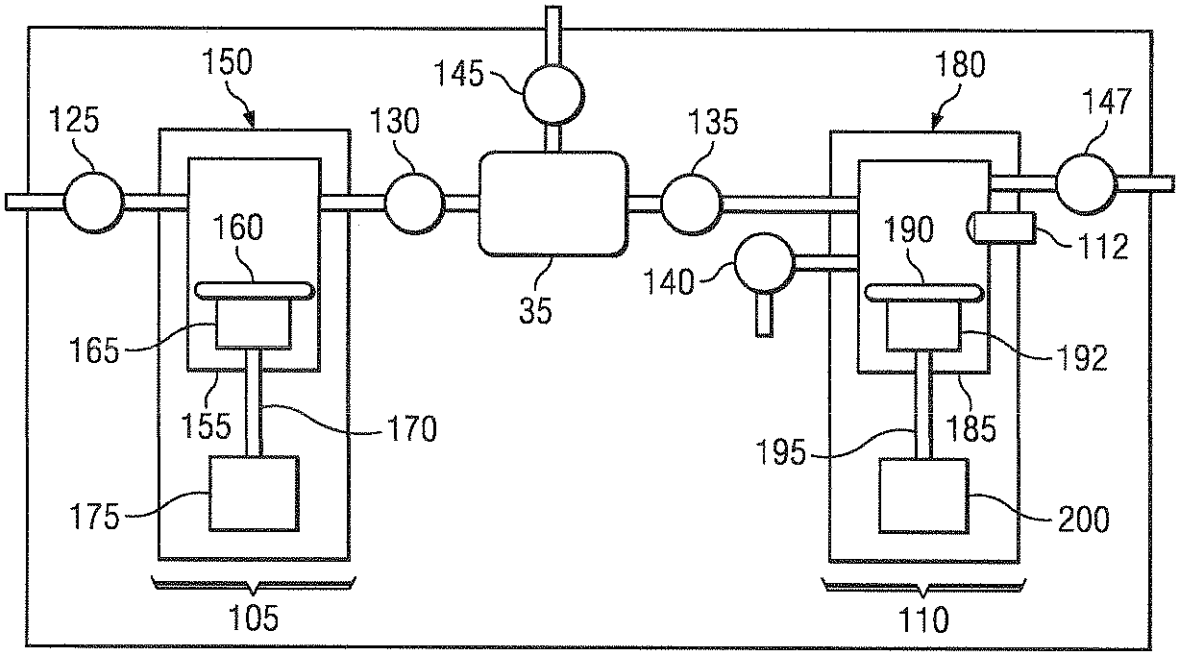

150
145
180
147
125
130
135
160
190
112
140
35
165
192
155
170
185
195
175
200
105
110

FIG. 2

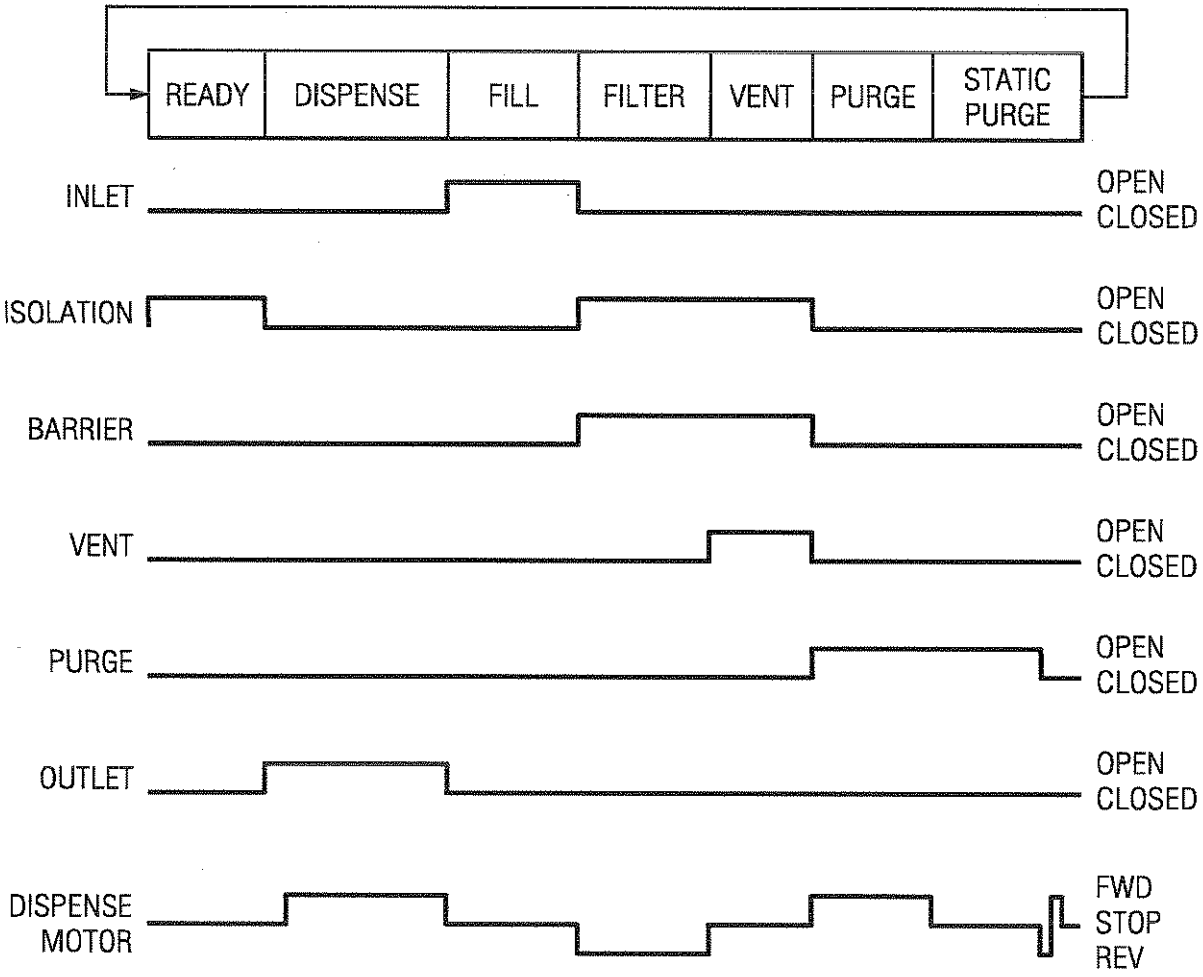

READY
DISPENSE
FILL
FILTER
VENT
PURGE
STATIC PURGE
INLET
ISOLATION
BARRIER
VENT
PURGE
OUTLET
DISPENSE MOTOR
OPEN
CLOSED
FWD
STOP
REV

FIG. 3

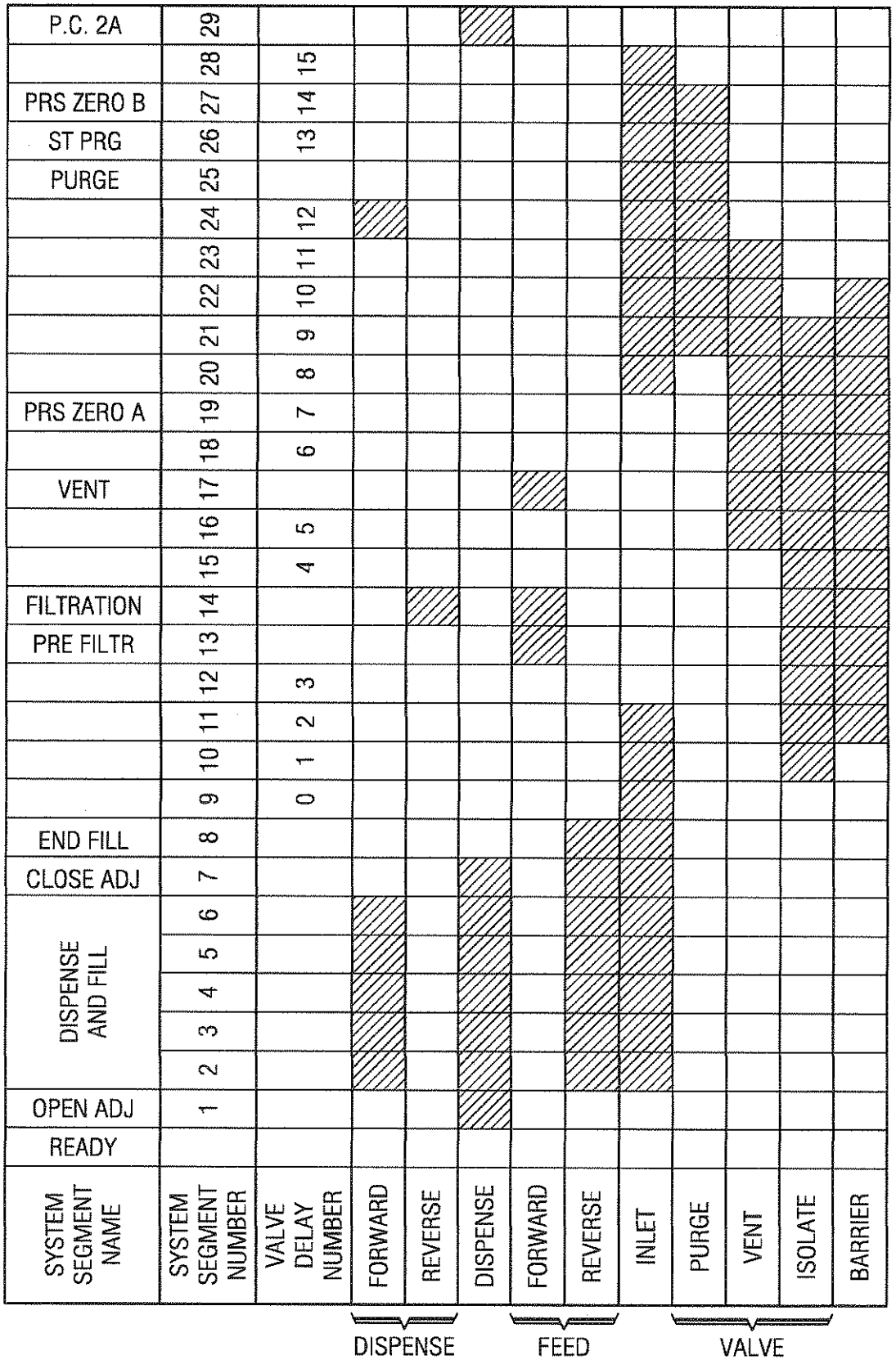

P.C. 2A
PRS ZERO B
ST PRG
PURGE
PRS ZERO A
VENT
FILTRATION
PRE FILTR
END FILL
CLOSE ADJ
DISPENSE AND FILL
OPEN ADJ
READY
SYSTEM SEGMENT NAME
SYSTEM SEGMENT NUMBER
VALVE DELAY NUMBER
FORWARD
REVERSE
DISPENSE
FORWARD
REVERSE
INLET
PURGE
VENT
ISOLATE
BARRIER
DISPENSE
FEED
VALVE

FIG. 4A

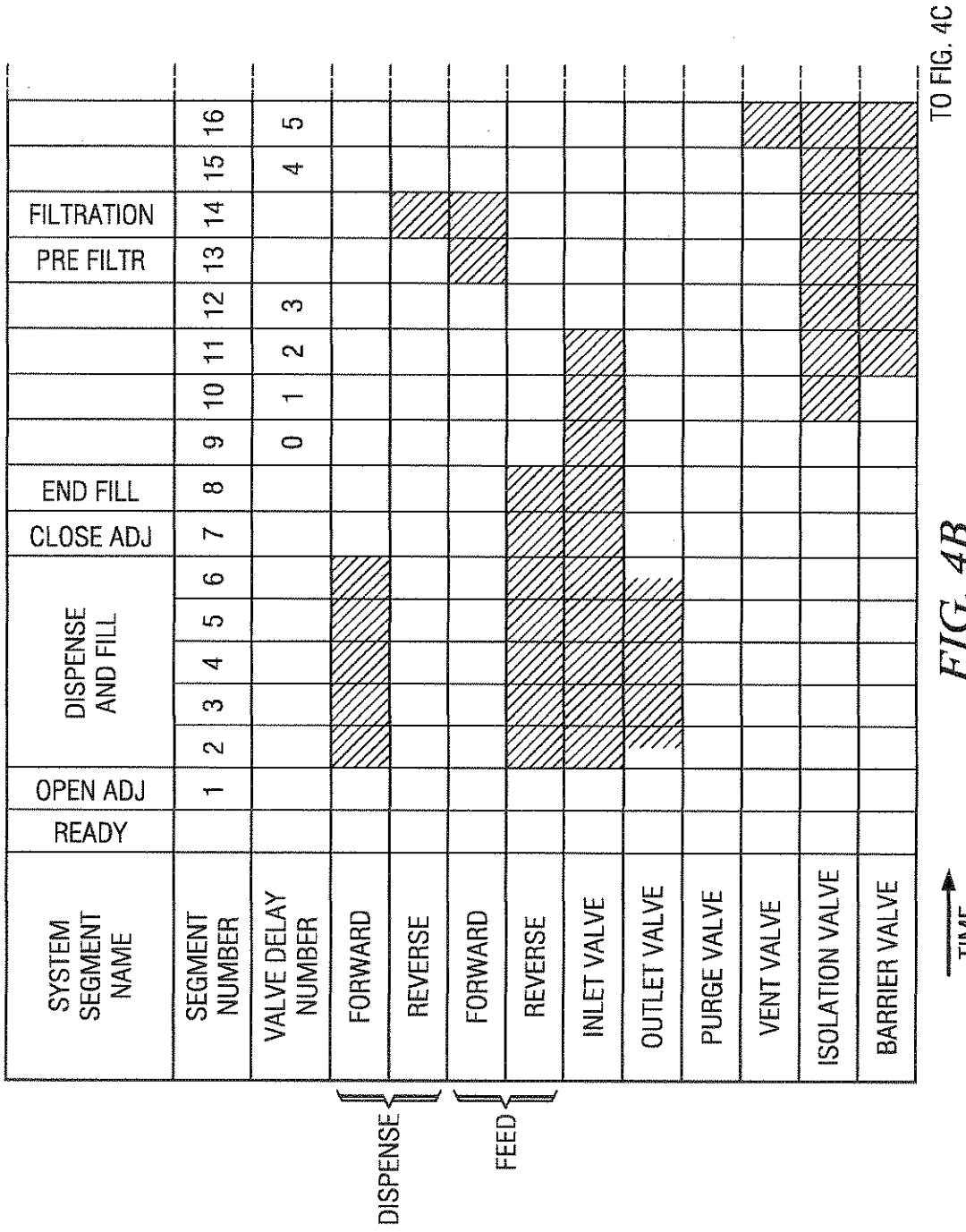

SYSTEM SEGMENT NAME
READY
OPEN ADJ
DISPENSE AND FILL
CLOSE ADJ
END FILL
FILTRATION
PRE FILTR
SEGMENT NUMBER
VALVE DELAY NUMBER
FORWARD
REVERSE
FORWARD
REVERSE
INLET VALVE
OUTLET VALVE
PURGE VALVE
VENT VALVE
ISOLATION VALVE
BARRIER VALVE
DISPENSE
FEED
TIME
TO FIG. 4C

FIG. 4B

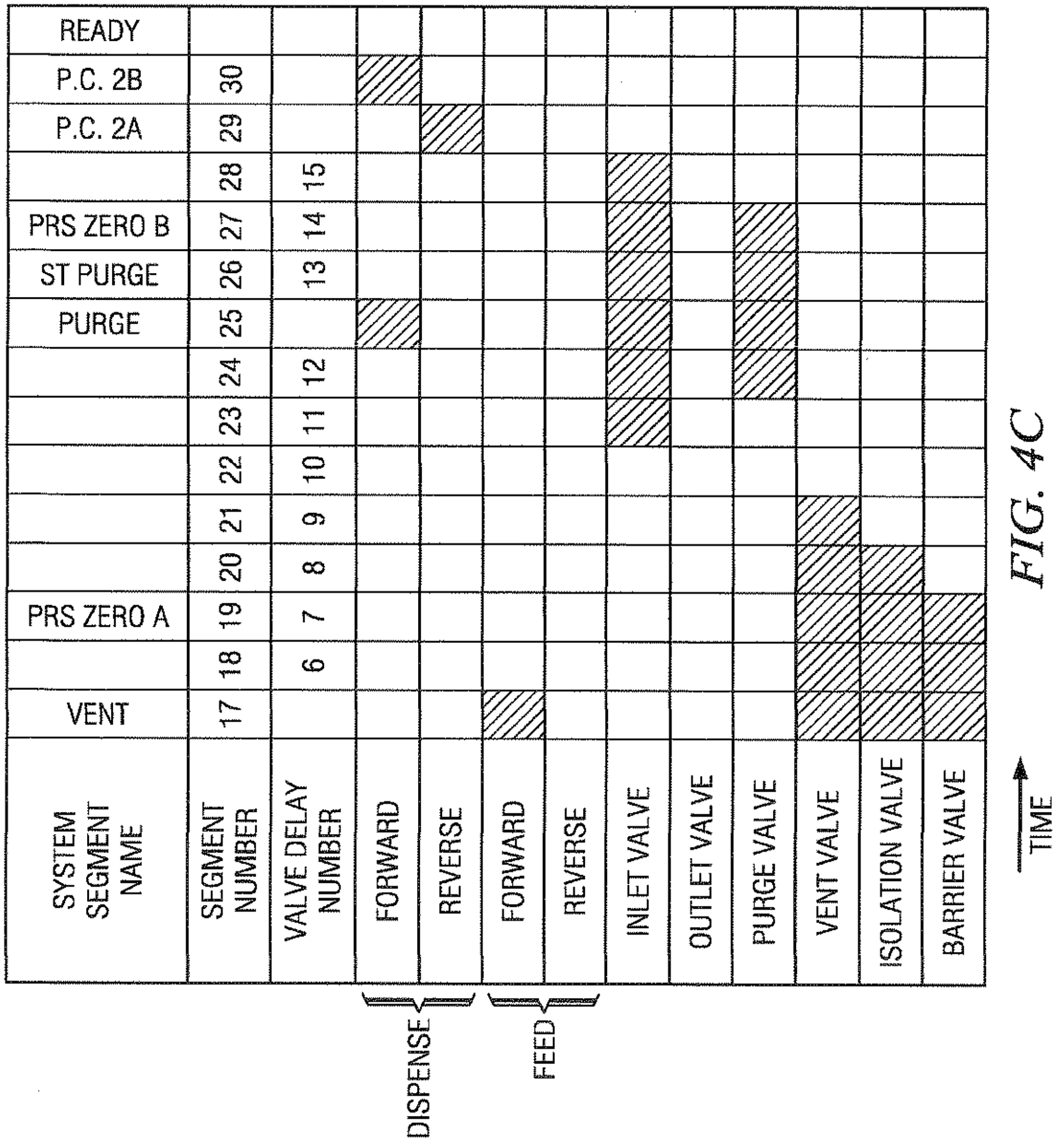

READY
P.C. 2B
P.C. 2A
PRS ZERO B
ST PURGE
PURGE
PRS ZERO A
VENT
SYSTEM SEGMENT NAME
SEGMENT NUMBER
VALVE DELAY NUMBER
FORWARD
REVERSE
FORWARD
REVERSE
INLET VALVE
OUTLET VALVE
PURGE VALVE
VENT VALVE
ISOLATION VALVE
BARRIER VALVE
DISPENSE
FEED
TIME

FIG. 4C

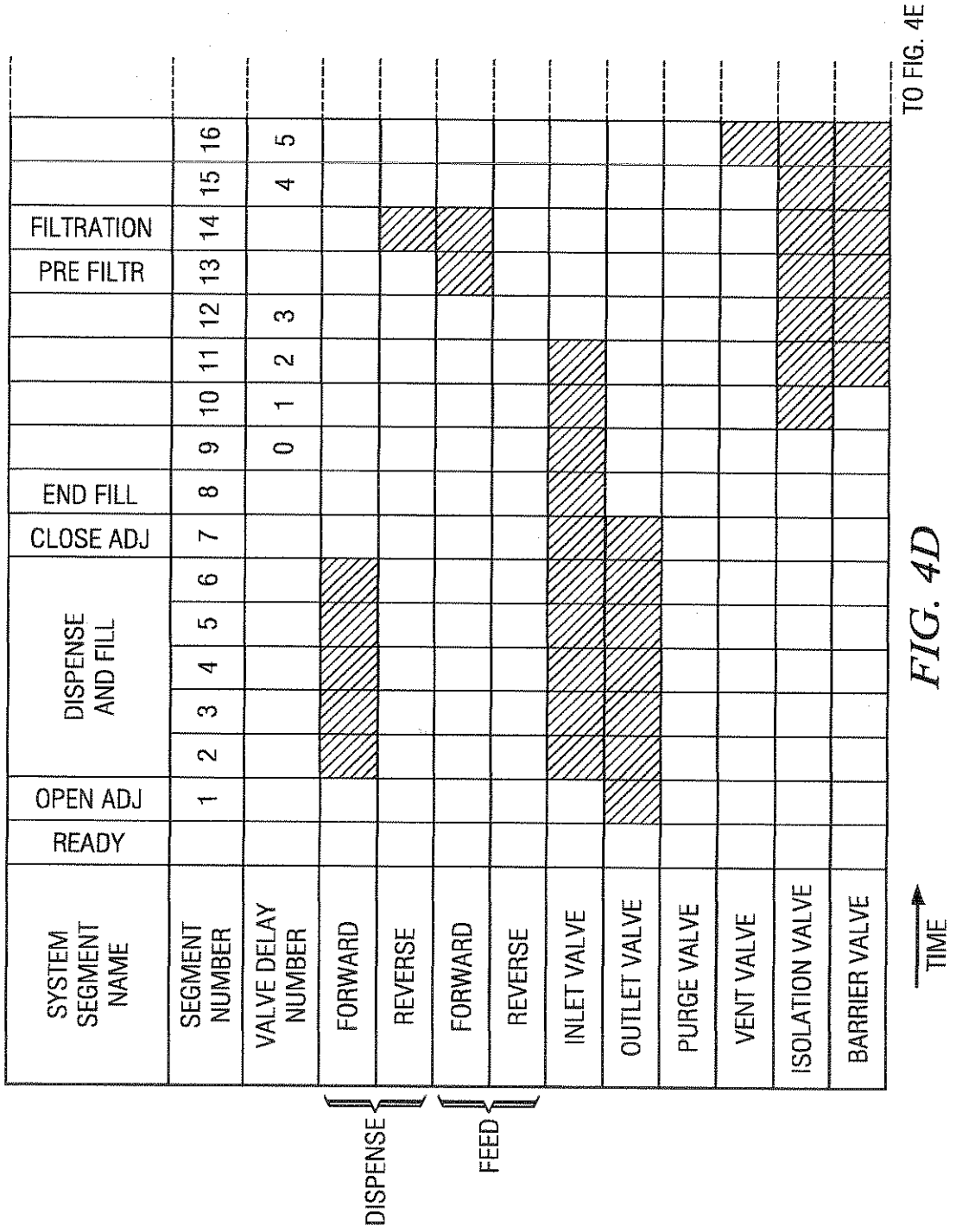

SYSTEM SEGMENT NAME
SEGMENT NUMBER
VALVE DELAY NUMBER
READY
OPEN ADJ
DISPENSE AND FILL
CLOSE ADJ
END FILL
PRE FILTR
FILTRATION
FORWARD
REVERSE
FORWARD
REVERSE
INLET VALVE
OUTLET VALVE
PURGE VALVE
VENT VALVE
ISOLATION VALVE
BARRIER VALVE
DISPENSE
FEED
TIME
TO FIG. 4E

FIG. 4D

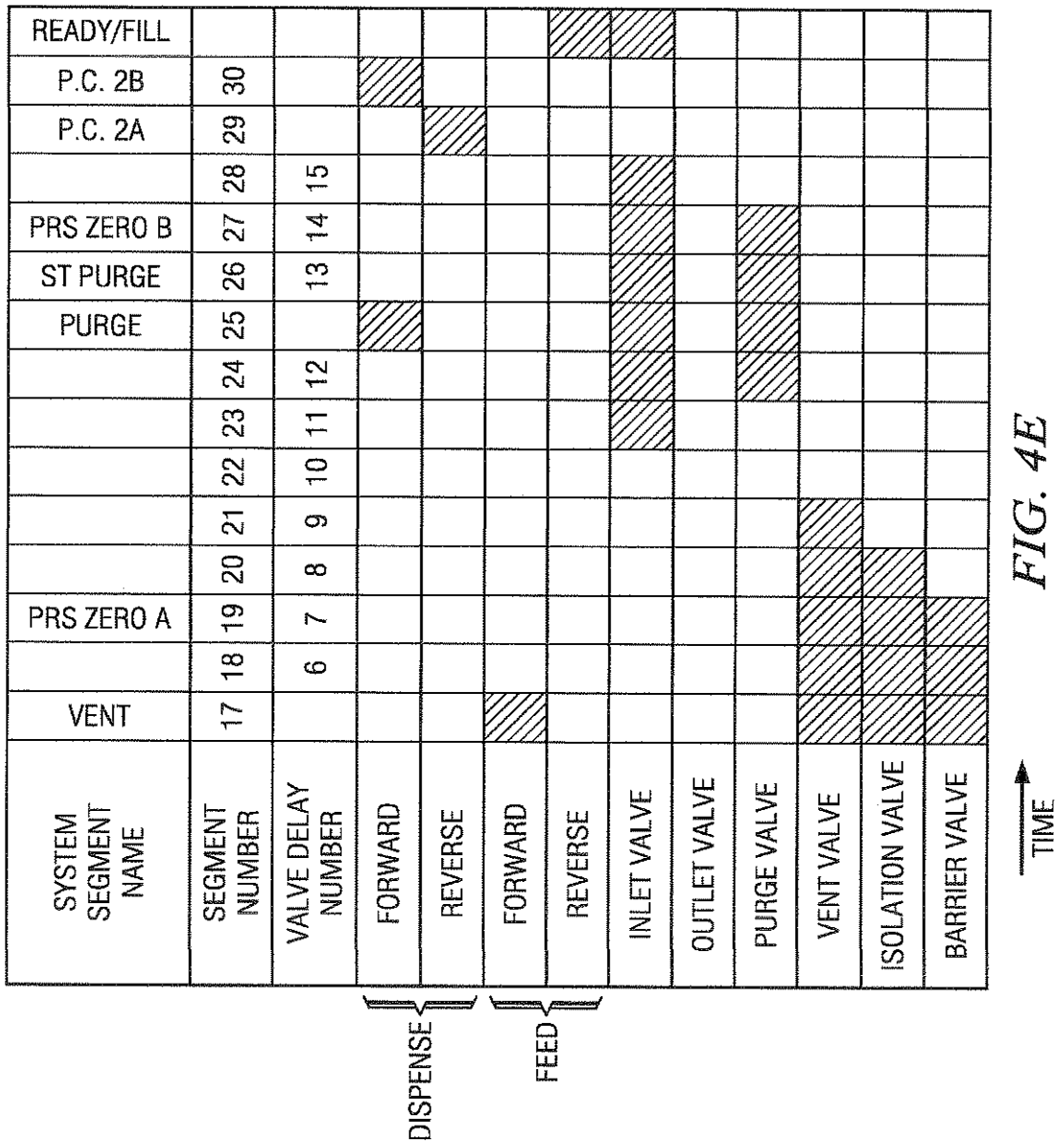

READY/FILL
P.C. 2B
P.C. 2A
PRS ZERO B
ST PURGE
PURGE
PRS ZERO A
VENT
SYSTEM SEGMENT NAME
SEGMENT NUMBER
30
29
28
27
26
25
24
23
22
21
20
19
18
17
VALVE DELAY NUMBER
15
14
13
12
11
10
9
8
7
6
FORWARD
REVERSE
FORWARD
REVERSE
INLET VALVE
OUTLET VALVE
PURGE VALVE
VENT VALVE
ISOLATION VALVE
BARRIER VALVE
DISPENSE
FEED
TIME

FIG. 4E

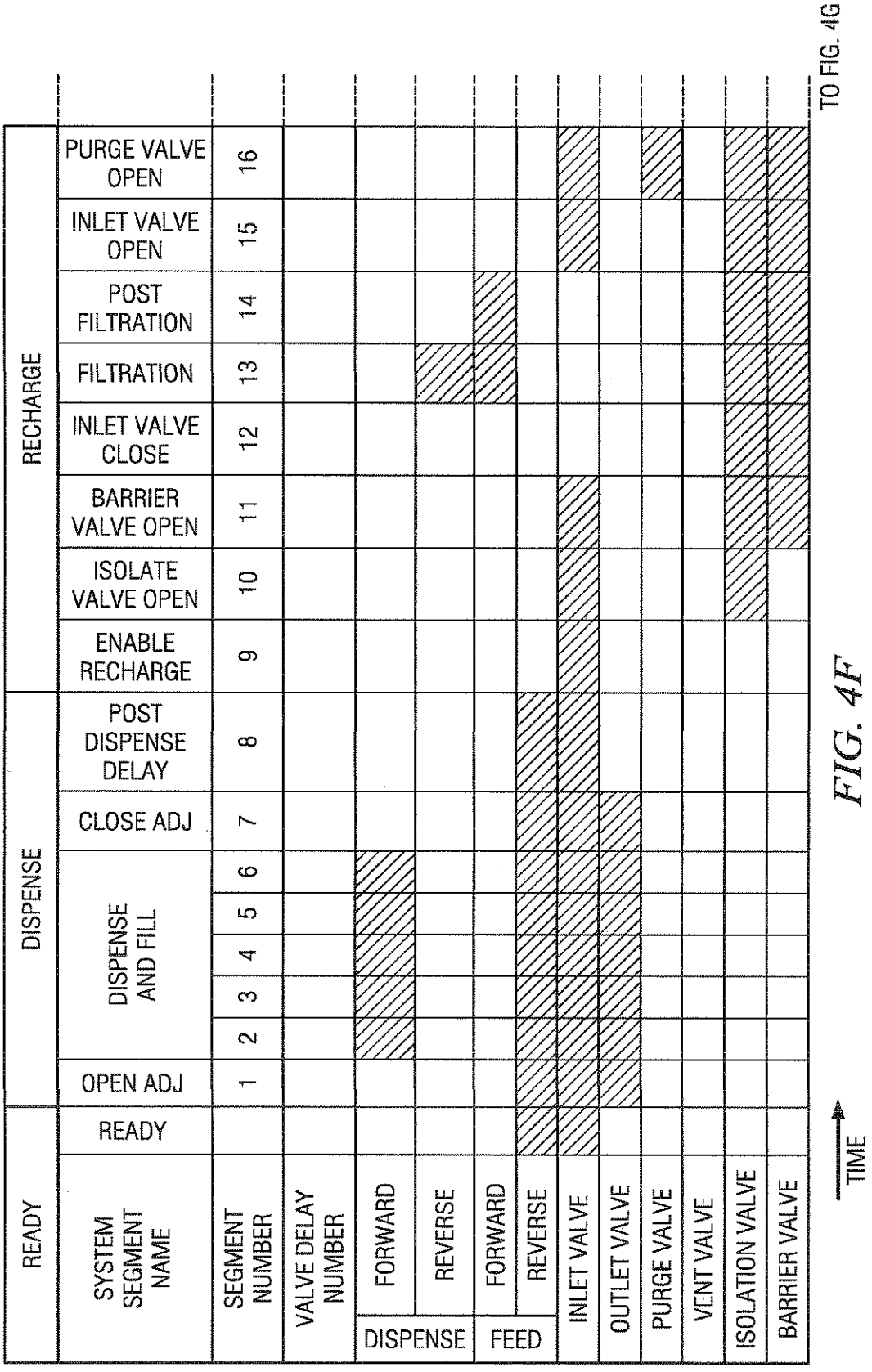

READY
DISPENSE
RECHARGE
SYSTEM SEGMENT NAME
READY
OPEN ADJ
DISPENSE AND FILL
CLOSE ADJ
POST DISPENSE DELAY
ENABLE RECHARGE
ISOLATE VALVE OPEN
BARRIER VALVE OPEN
INLET VALVE CLOSE
FILTRATION
POST FILTRATION
INLET VALVE OPEN
PURGE VALVE OPEN
SEGMENT NUMBER
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
VALVE DELAY NUMBER
FORWARD
REVERSE
FORWARD
REVERSE
DISPENSE
FEED
INLET VALVE
OUTLET VALVE
PURGE VALVE
VENT VALVE
ISOLATION VALVE
BARRIER VALVE
TIME
TO FIG. 4G

FIG. 4F

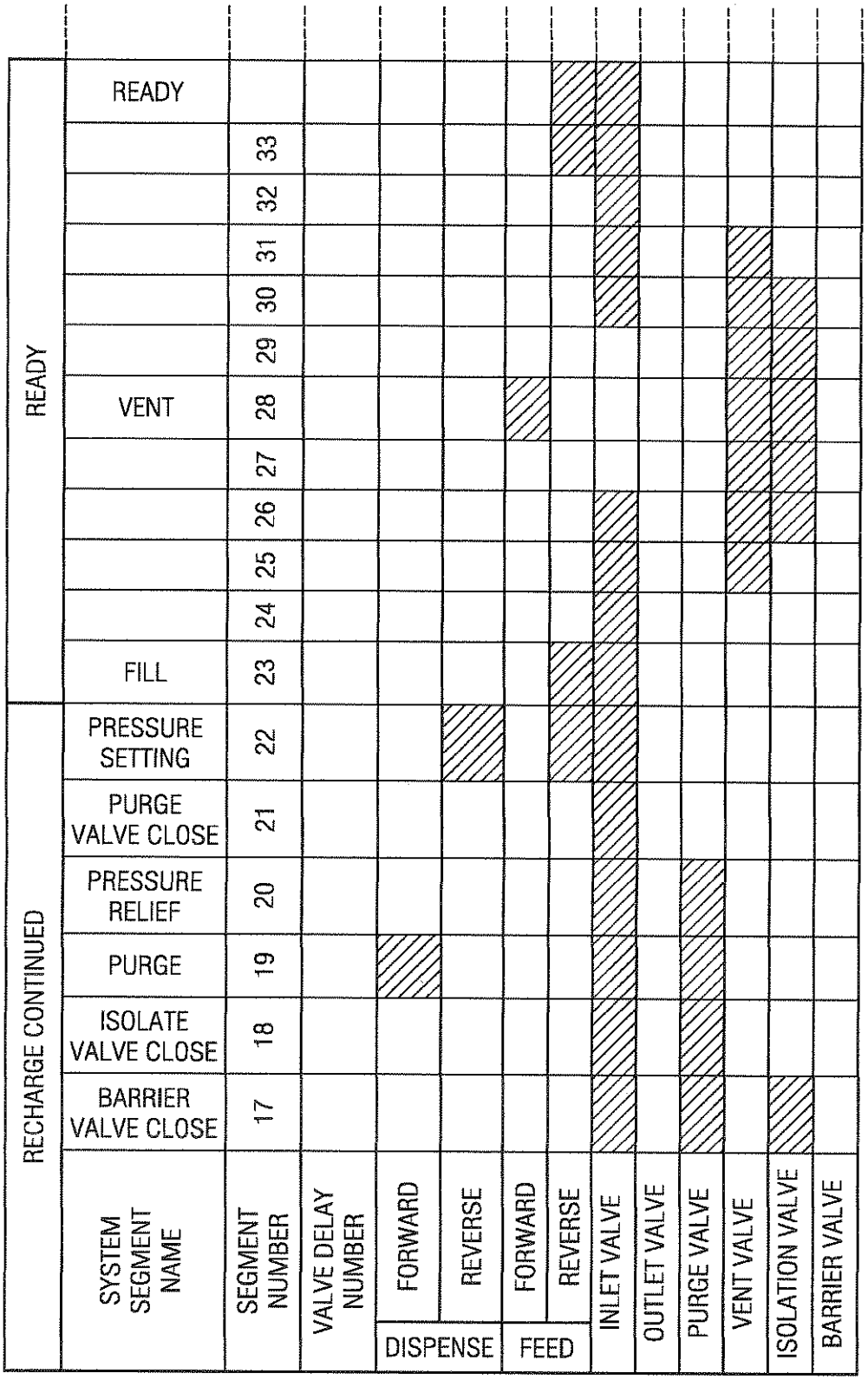

READY
RECHARGE CONTINUED
READY
PRESSURE SETTING
PURGE VALVE CLOSE
PRESSURE RELIEF
PURGE
ISOLATE VALVE CLOSE
BARRIER VALVE CLOSE
FILL
VENT
SYSTEM SEGMENT NAME
SEGMENT NUMBER
VALVE DELAY NUMBER
DISPENSE
FEED
FORWARD
REVERSE
FORWARD
REVERSE
INLET VALVE
OUTLET VALVE
PURGE VALVE
VENT VALVE
ISOLATION VALVE
BARRIER VALVE
17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33
TIME

FIG. 4G

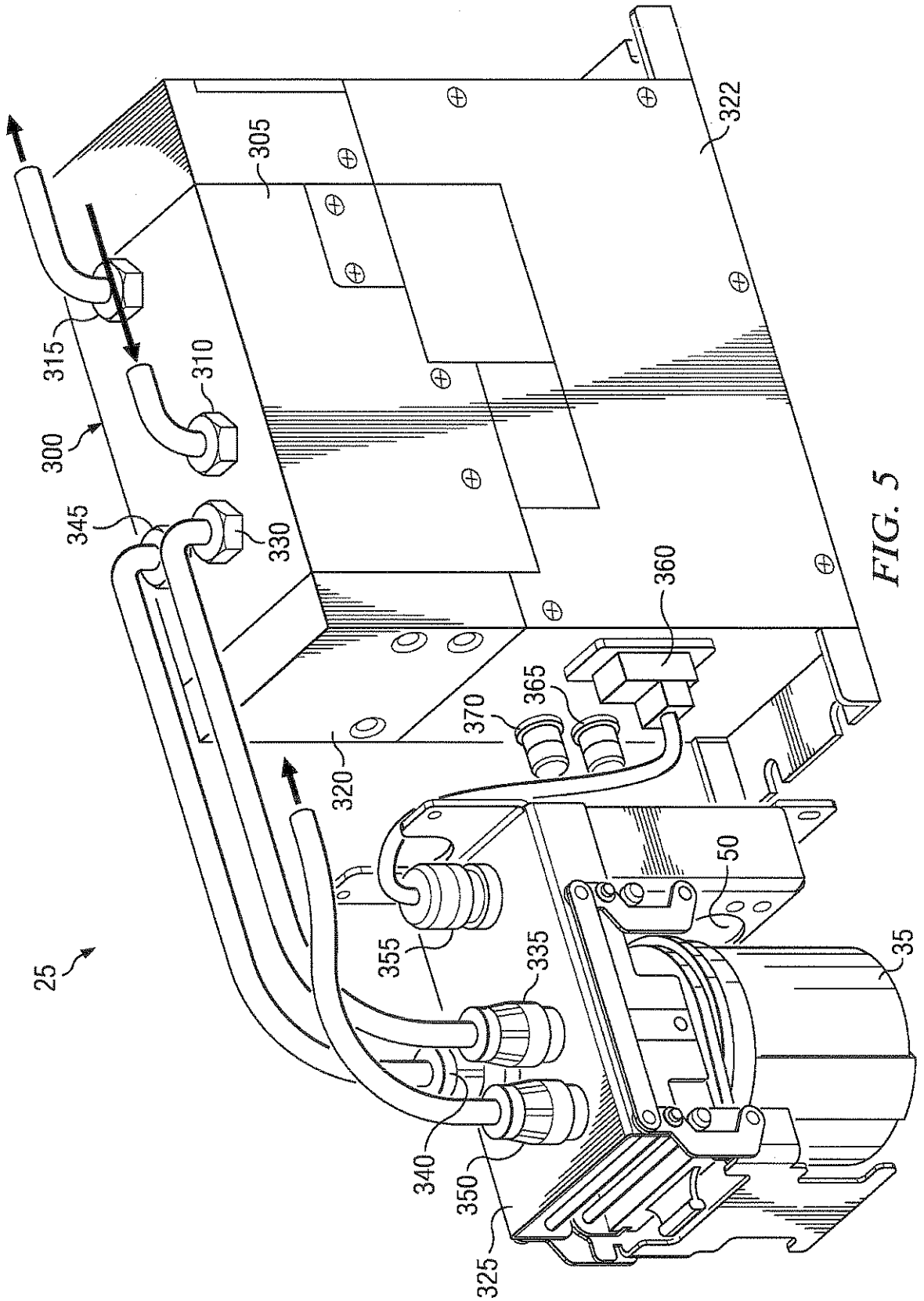

305
322
315
310
300
345
330
360
365
370
320
50
355
335
35
340
350
325
25

FIG. 5

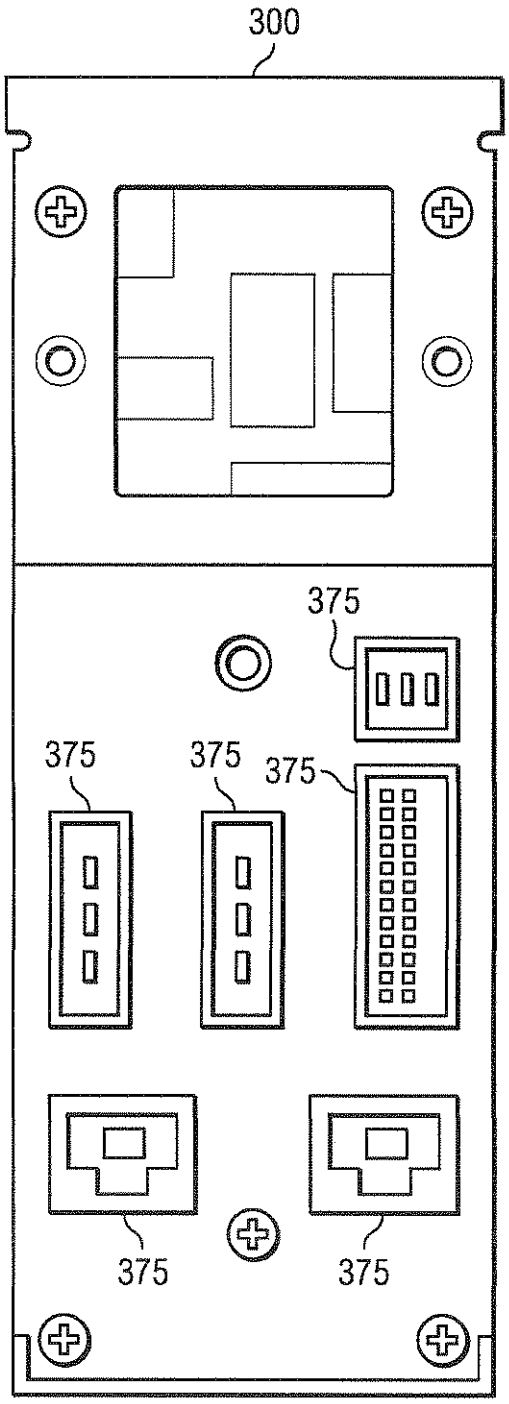


FIG. 6

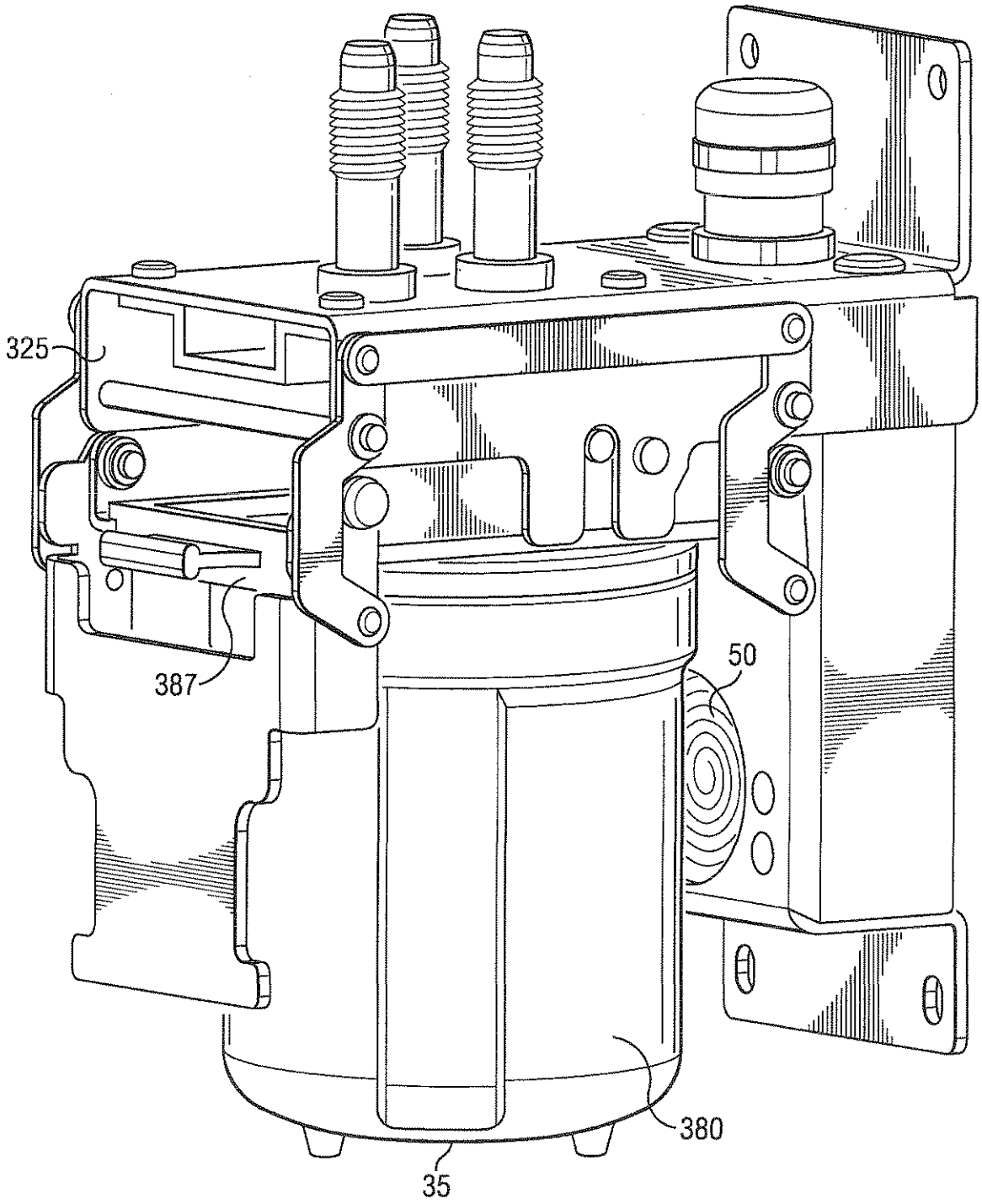


FIG. 7

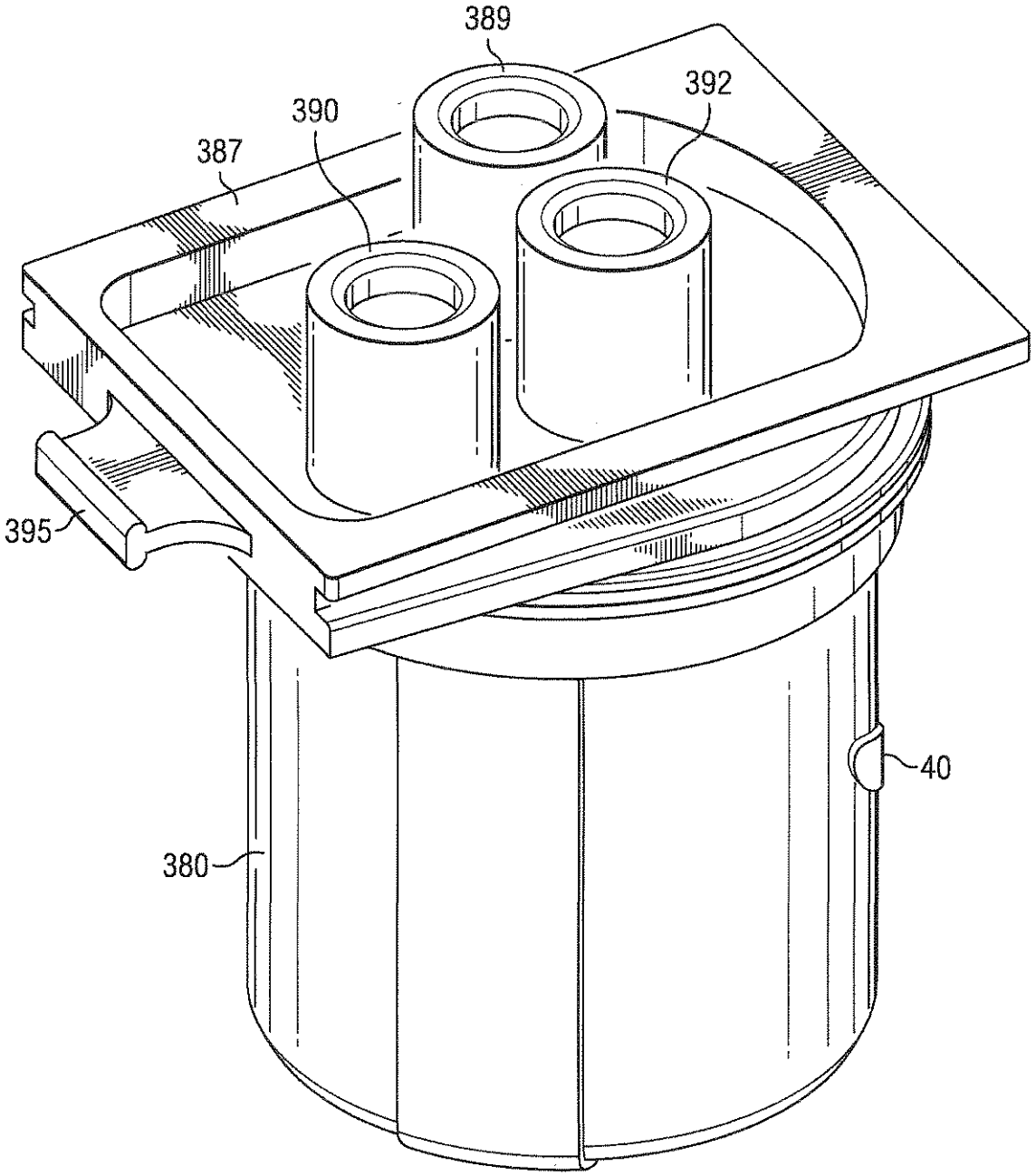


FIG. 8

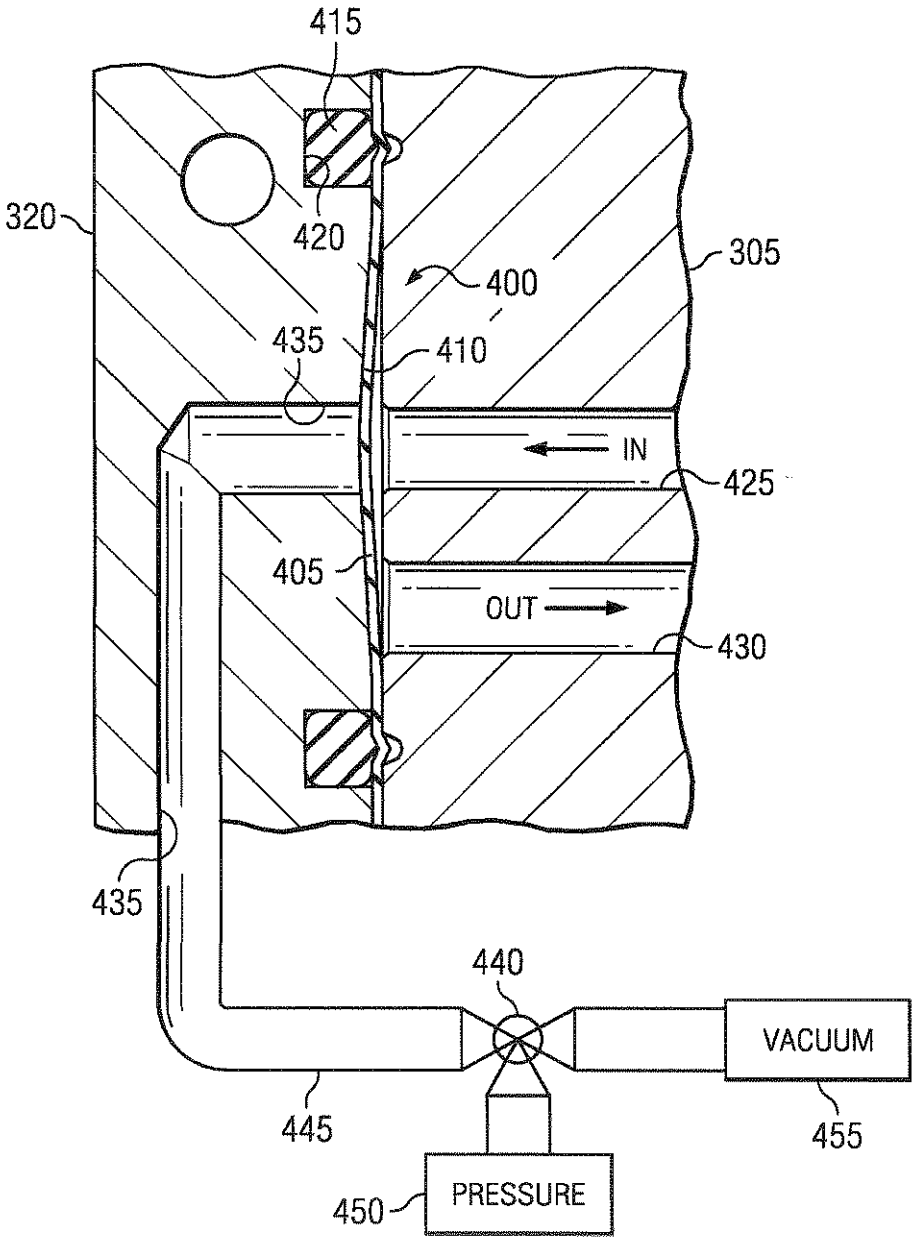

415
320
420
305
400
435
410
IN
425
405
OUT
430
435
440
VACUUM
445
455
450
PRESSURE

FIG. 9

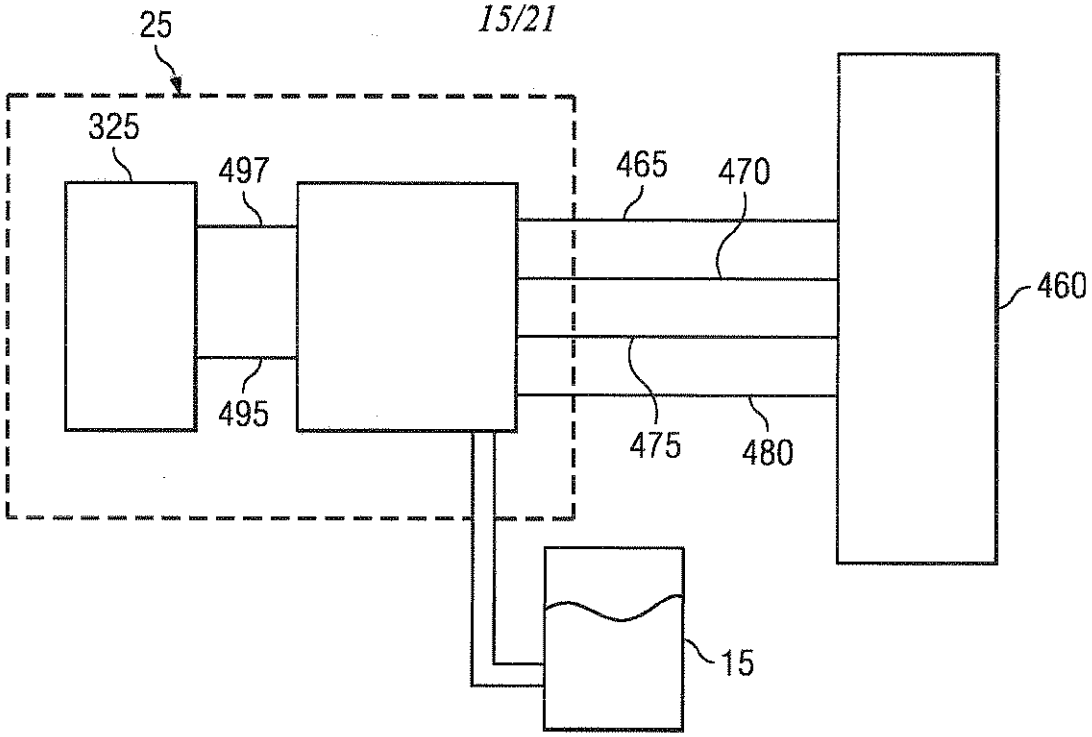

25
325
497
465
470
460
495
475
480
15

FIG. 10

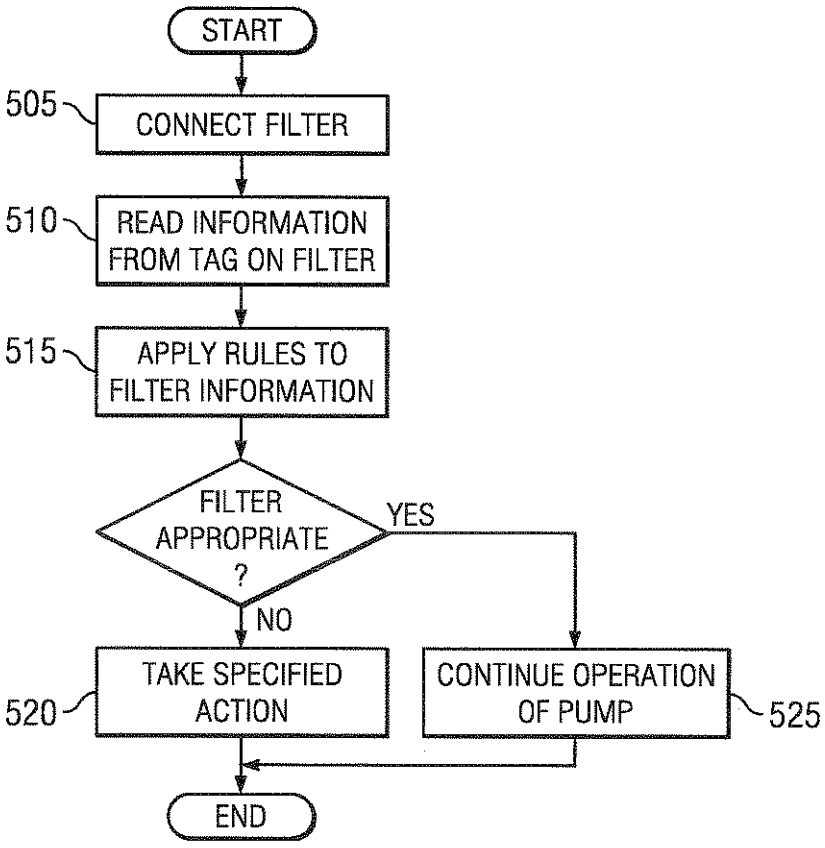

START
505
CONNECT FILTER
510
READ INFORMATION FROM TAG ON FILTER
515
APPLY RULES TO FILTER INFORMATION
FILTER APPROPRIATE ?
YES
NO
520
TAKE SPECIFIED ACTION
CONTINUE OPERATION OF PUMP
525
END

FIG. 12

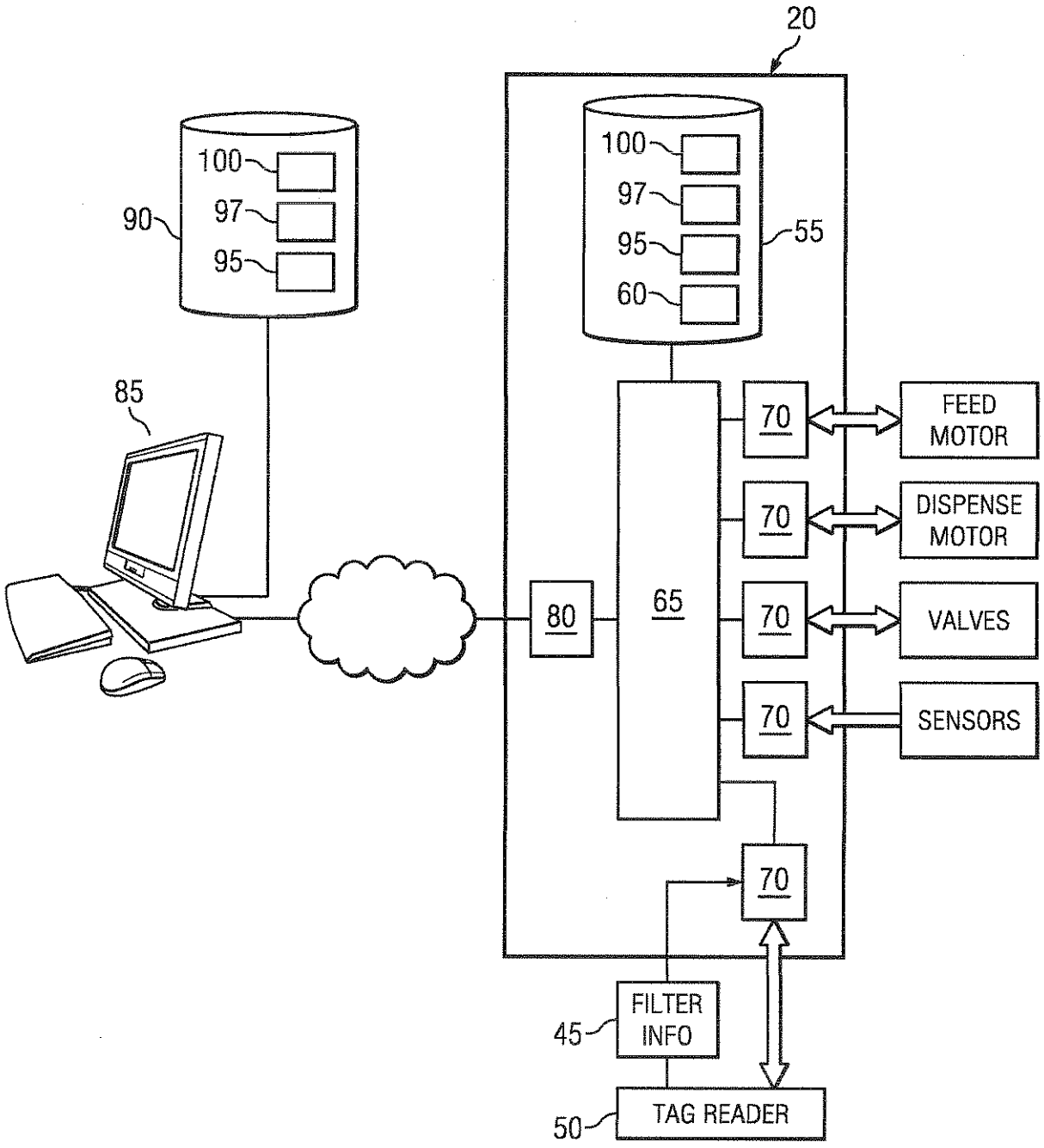

20
100
97
95
60
55
90
100
97
95
85
70
FEED MOTOR
70
DISPENSE MOTOR
80
65
70
VALVES
70
SENSORS
70
FILTER INFO
45
TAG READER
50

FIG. 11

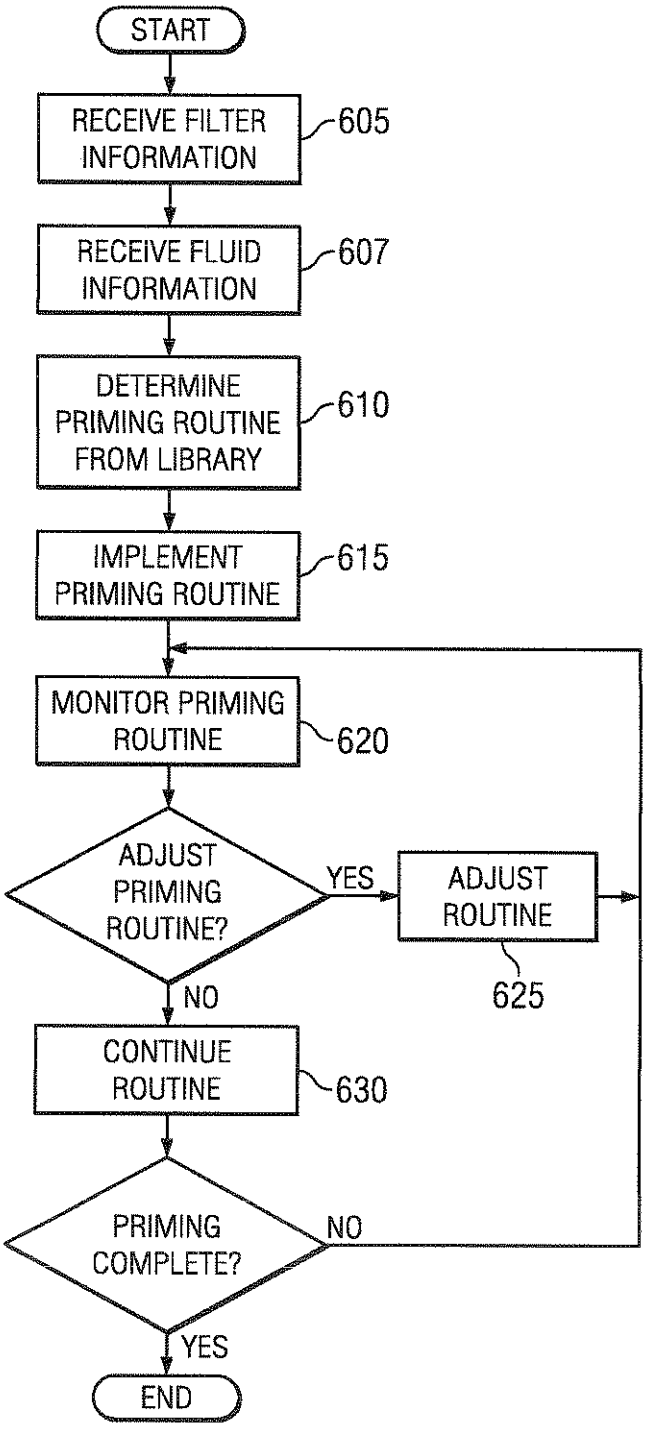

START
RECEIVE FILTER INFORMATION
605
RECEIVE FLUID INFORMATION
607
DETERMINE PRIMING ROUTINE FROM LIBRARY
610
IMPLEMENT PRIMING ROUTINE
615
MONITOR PRIMING ROUTINE
620
ADJUST PRIMING ROUTINE?
YES
ADJUST ROUTINE
625
NO
CONTINUE ROUTINE
630
PRIMING COMPLETE?
NO
YES
END

FIG. 13

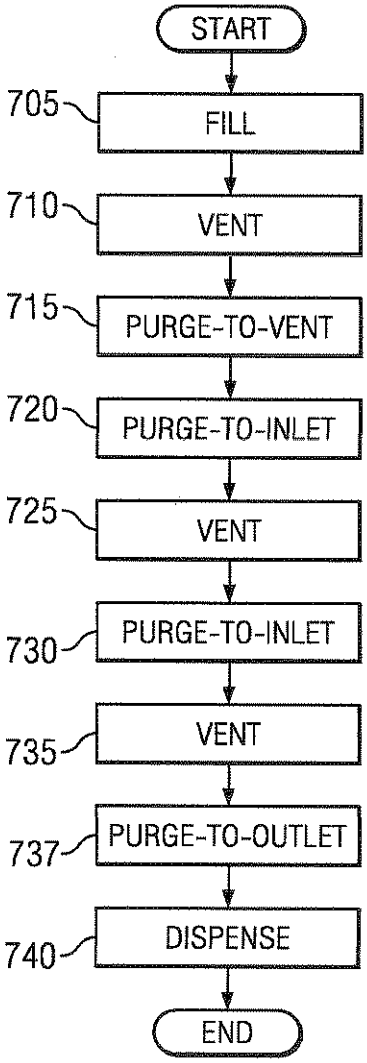

START
705
FILL
710
VENT
715
PURGE-TO-VENT
720
PURGE-TO-INLET
725
VENT
730
PURGE-TO-INLET
735
VENT
737
PURGE-TO-OUTLET
740
DISPENSE
END

FIG. 14

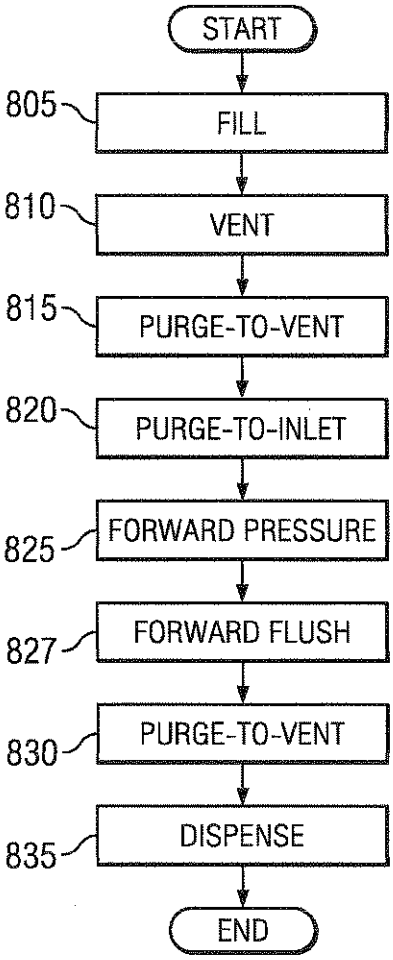

START
805
FILL
810
VENT
815
PURGE-TO-VENT
820
PURGE-TO-INLET
825
FORWARD PRESSURE
827
FORWARD FLUSH
830
PURGE-TO-VENT
835
DISPENSE
END

FIG. 15

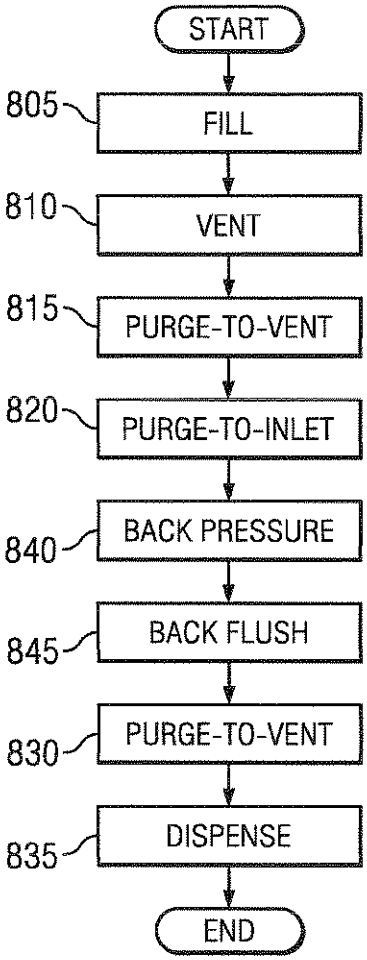

START
805
FILL
810
VENT
815
PURGE-TO-VENT
820
PURGE-TO-INLET
840
BACK PRESSURE
845
BACK FLUSH
830
PURGE-TO-VENT
835
DISPENSE
END

FIG. 16

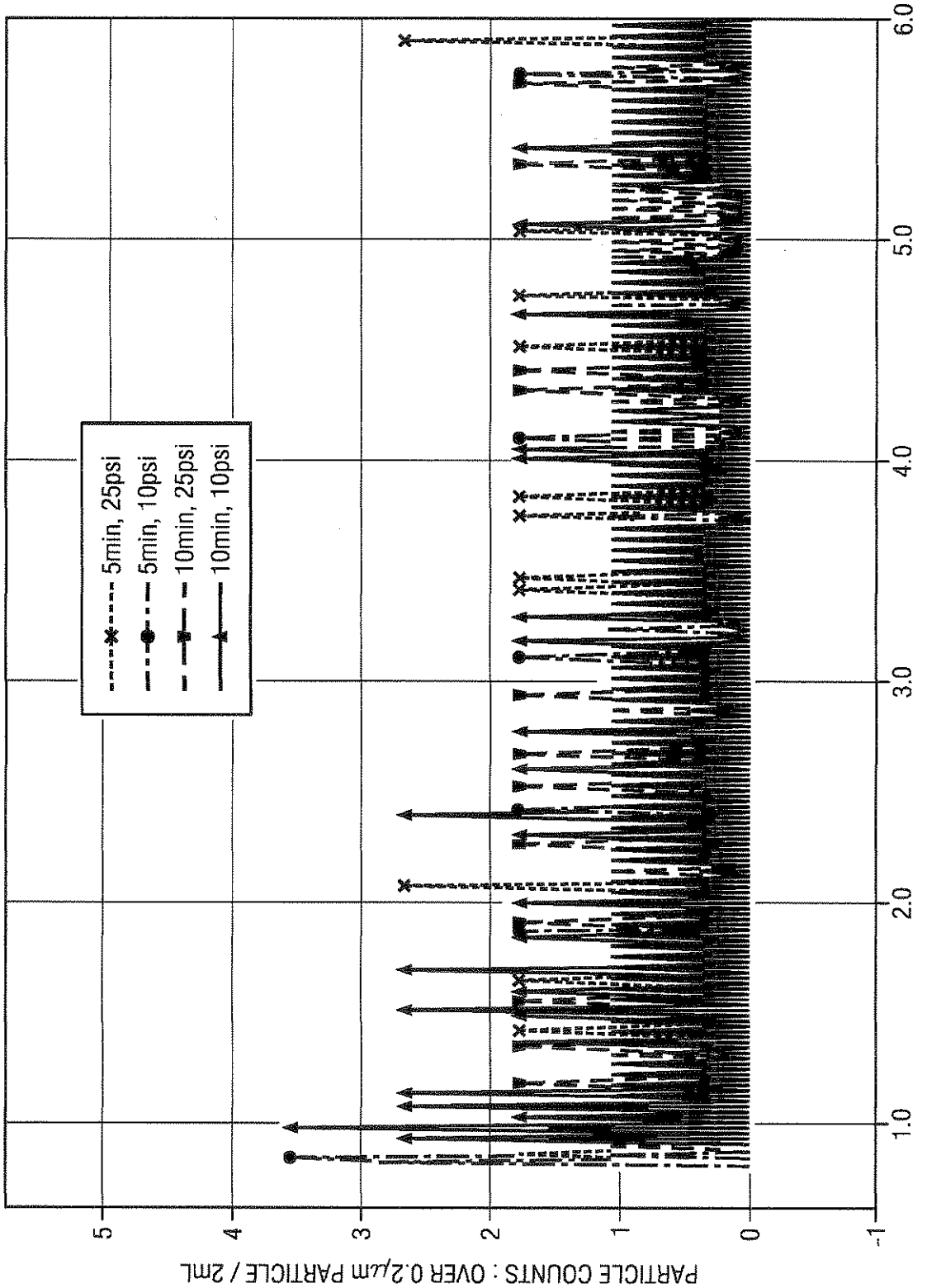

5min, 25psi
5min, 10psi
10min, 25psi
10min, 10psi
PARTICLE COUNTS : OVER 0.2μm PARTICLE / 2mL
TIME [h]
-1
0
1
2
3
4
5
1.0
2.0
3.0
4.0
5.0
6.0

FIG. 17

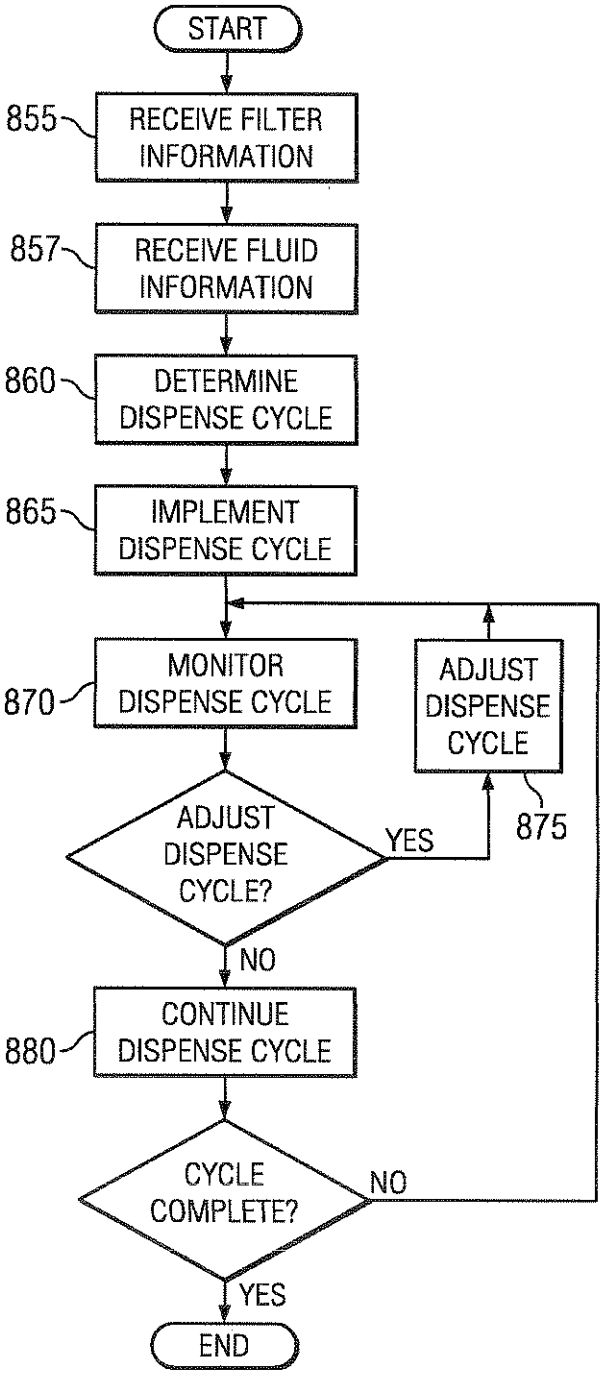

START
855
RECEIVE FILTER INFORMATION
857
RECEIVE FLUID INFORMATION
860
DETERMINE DISPENSE CYCLE
865
IMPLEMENT DISPENSE CYCLE
870
MONITOR DISPENSE CYCLE
ADJUST DISPENSE CYCLE
875
ADJUST DISPENSE CYCLE?
YES
NO
880
CONTINUE DISPENSE CYCLE
CYCLE COMPLETE?
NO
YES
END

FIG. 18

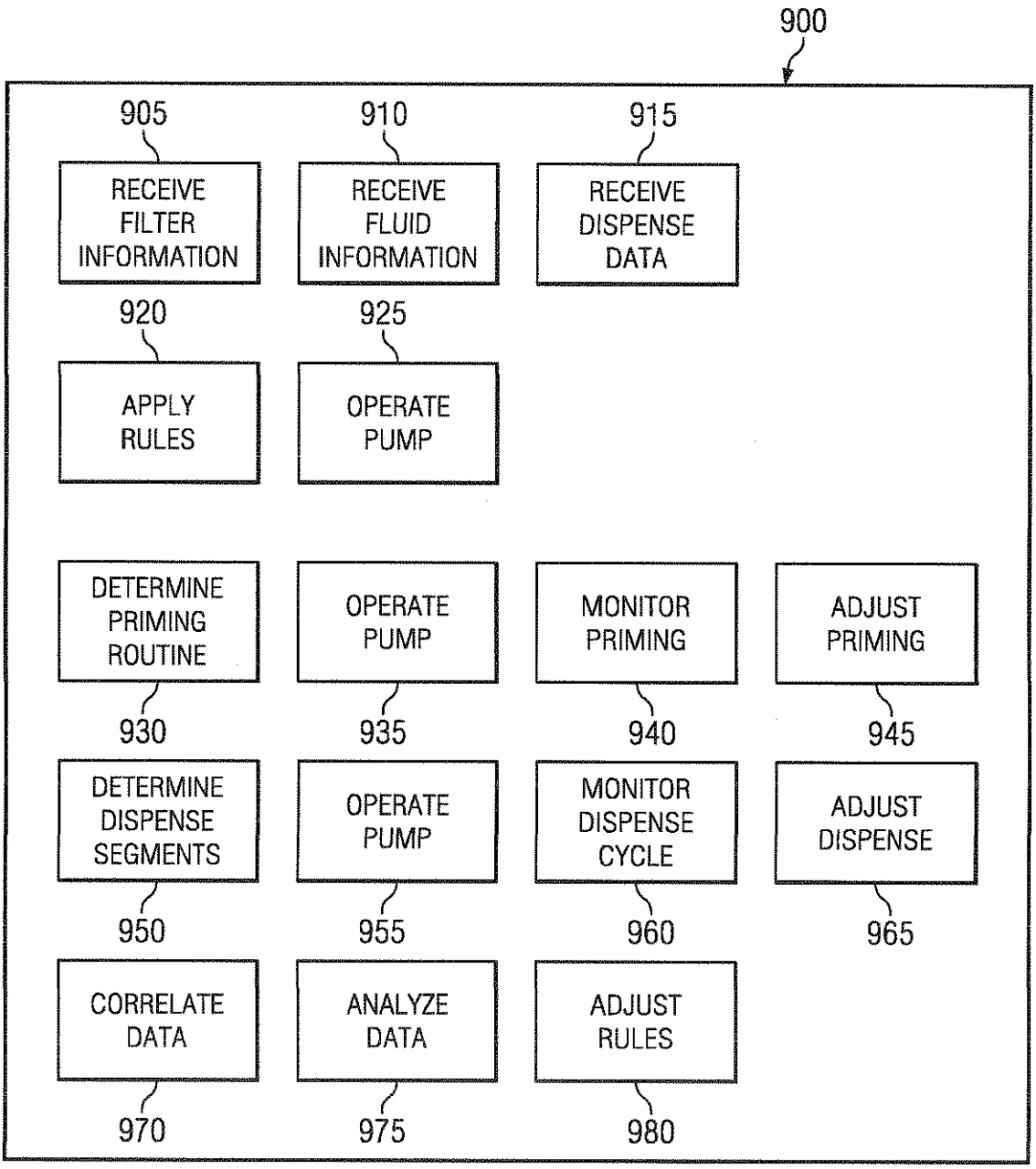

900
905
RECEIVE FILTER INFORMATION
910
RECEIVE FLUID INFORMATION
915
RECEIVE DISPENSE DATA
920
APPLY RULES
925
OPERATE PUMP
DETERMINE PRIMING ROUTINE
930
OPERATE PUMP
935
MONITOR PRIMING
940
ADJUST PRIMING
945
DETERMINE DISPENSE SEGMENTS
950
OPERATE PUMP
955
MONITOR DISPENSE CYCLE
960
ADJUST DISPENSE
965
CORRELATE DATA
970
ANALYZE DATA
975
ADJUST RULES
980

FIG. 19