FIG. 1

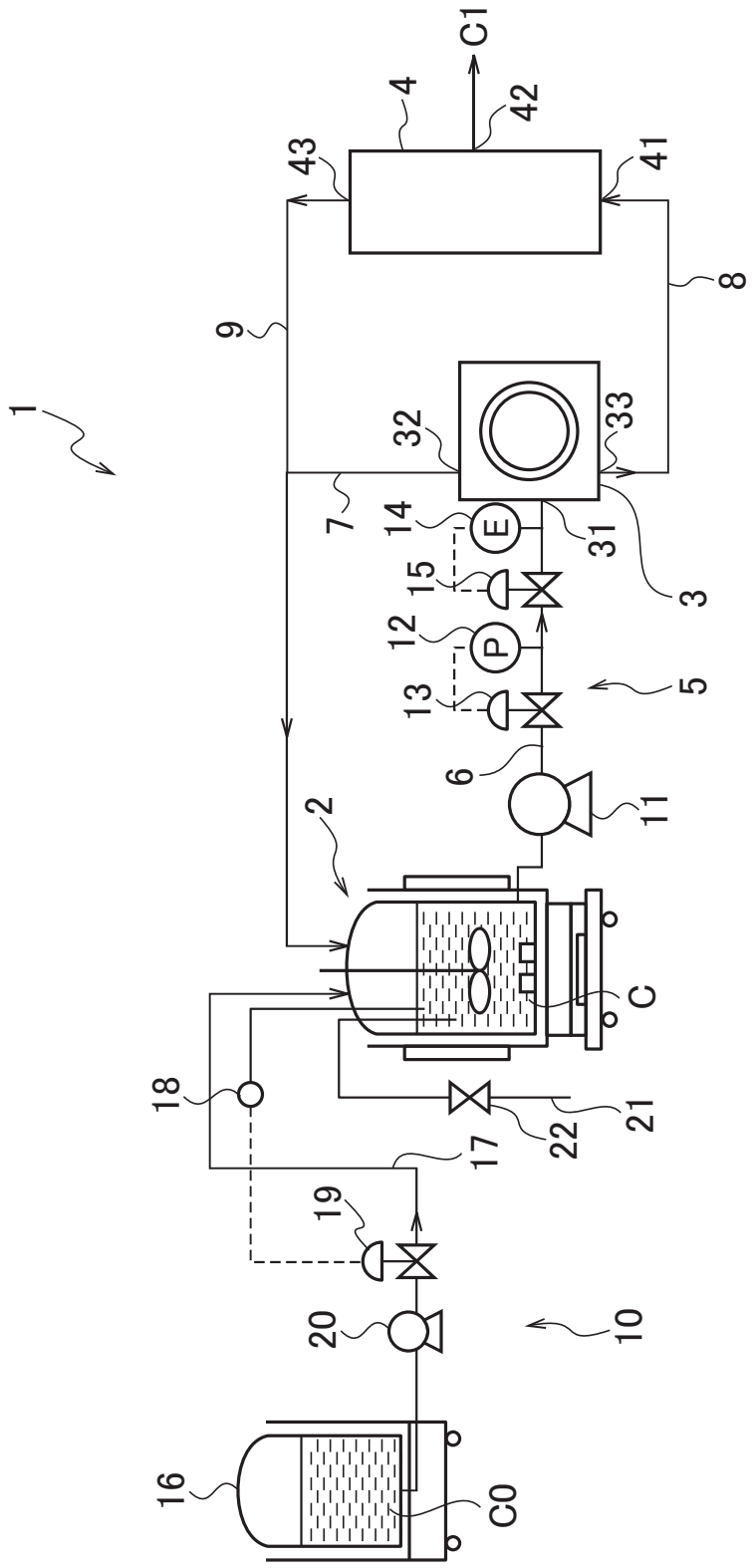

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
31
32
33
41
42
43
C
C0
C1
E
P

FIG. 2

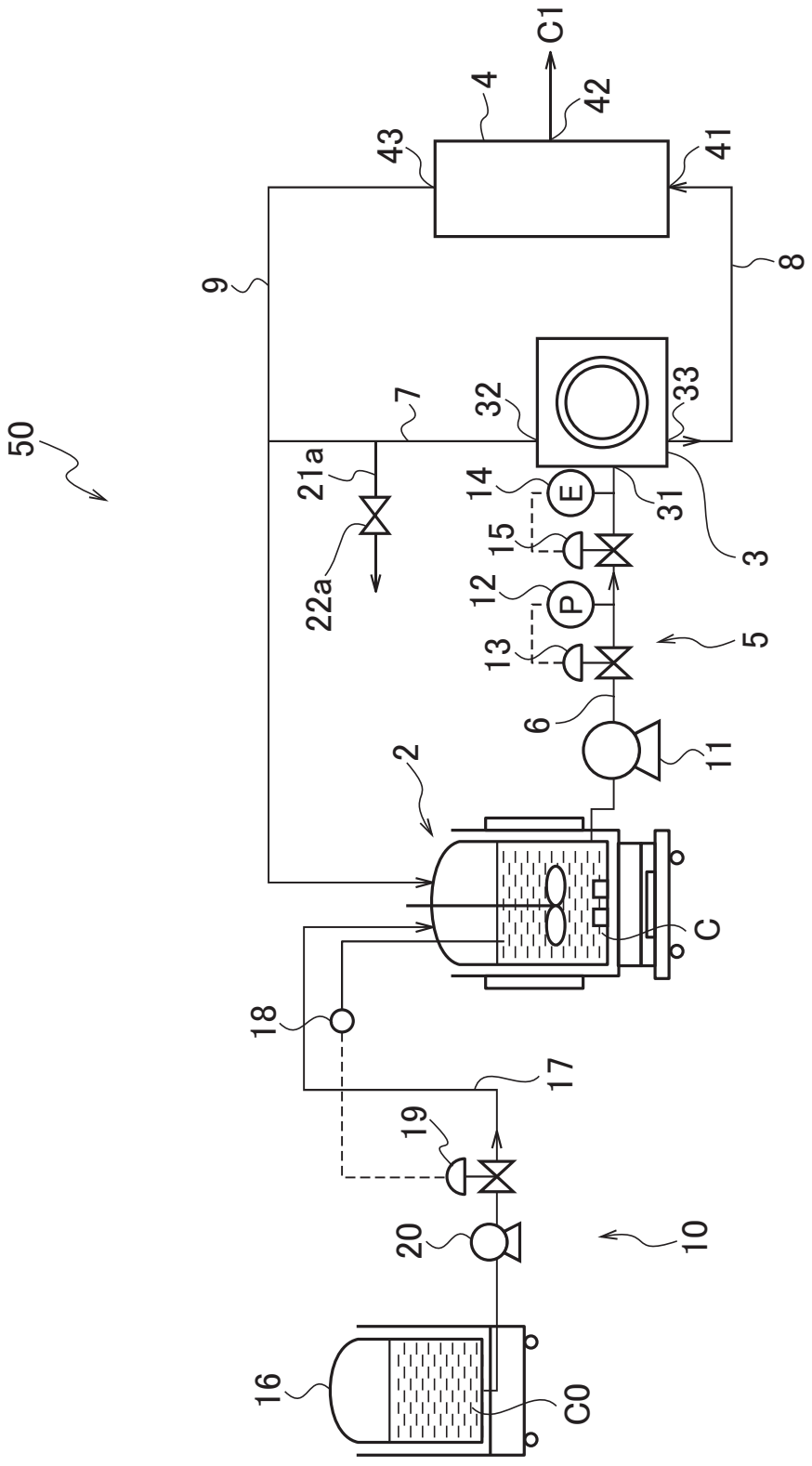

50
C1
4
42
43
41
9
8
7
32
33
21a
14
E
31
3
22a
15
12
P
13
5
6
11
2
C
18
17
19
20
10
16
C0

FIG. 3

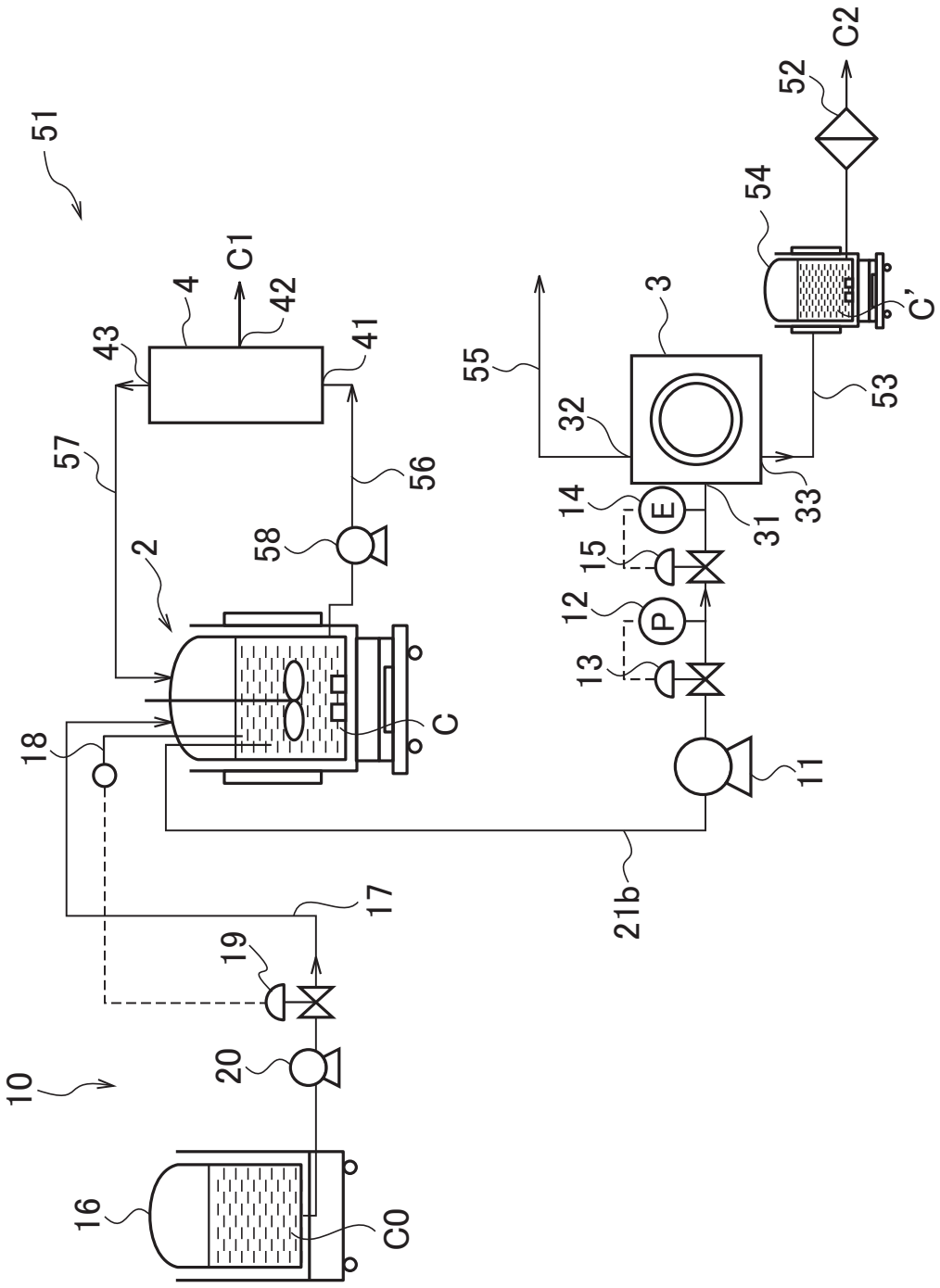

51
C1
4
42
43
41
57
56
58
2
C
18
17
19
20
10
16
C0
55
3
32
14
E
15
12
P
13
31
33
11
21b
52
C2
54
C'
53

FIG. 4

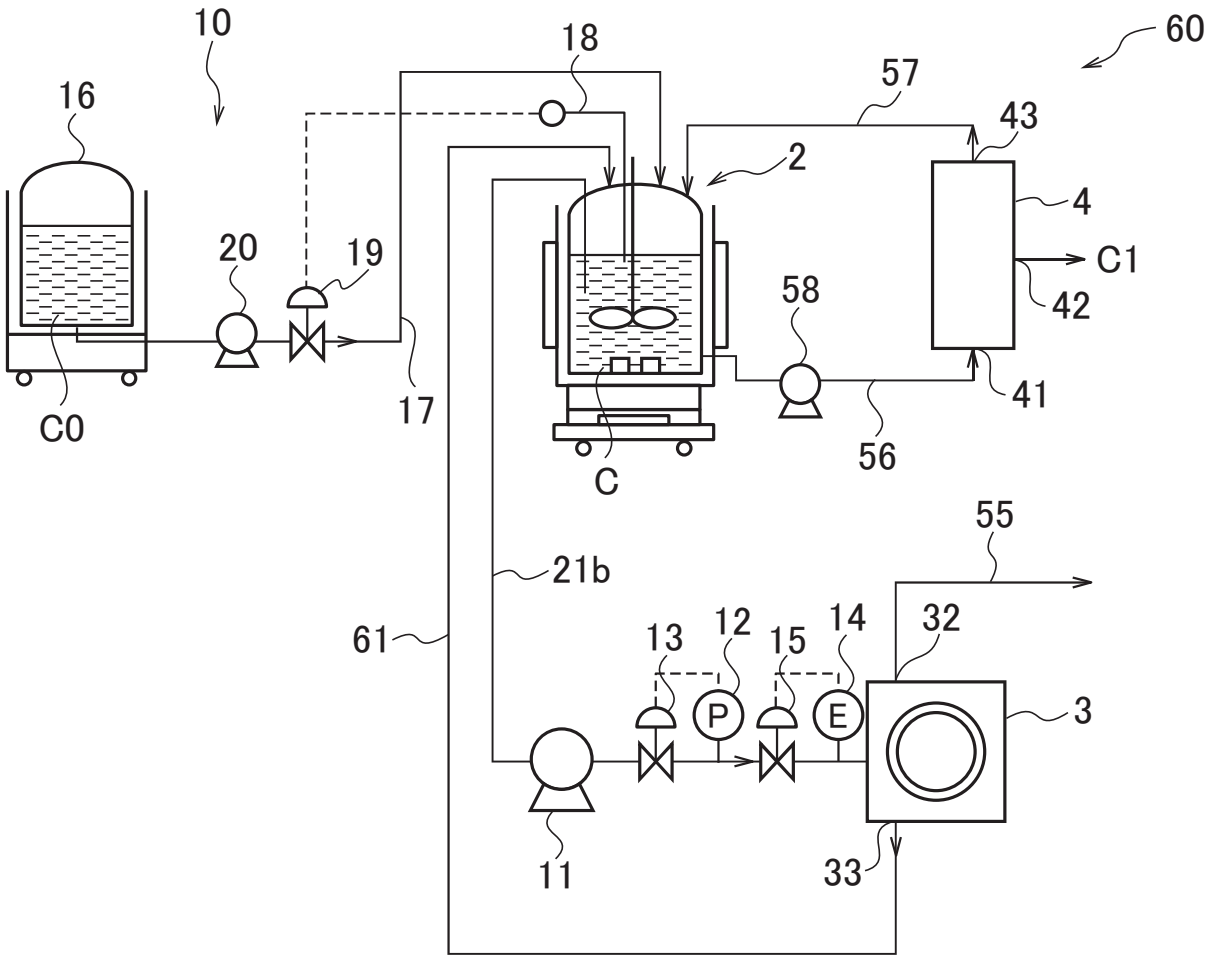

10
16
18
60
57
43
2
4
C1
42
20
19
58
41
C0
17
C
56
55
21b
61
13
12
15
14
32
3
P
E
11
33

FIG. 5

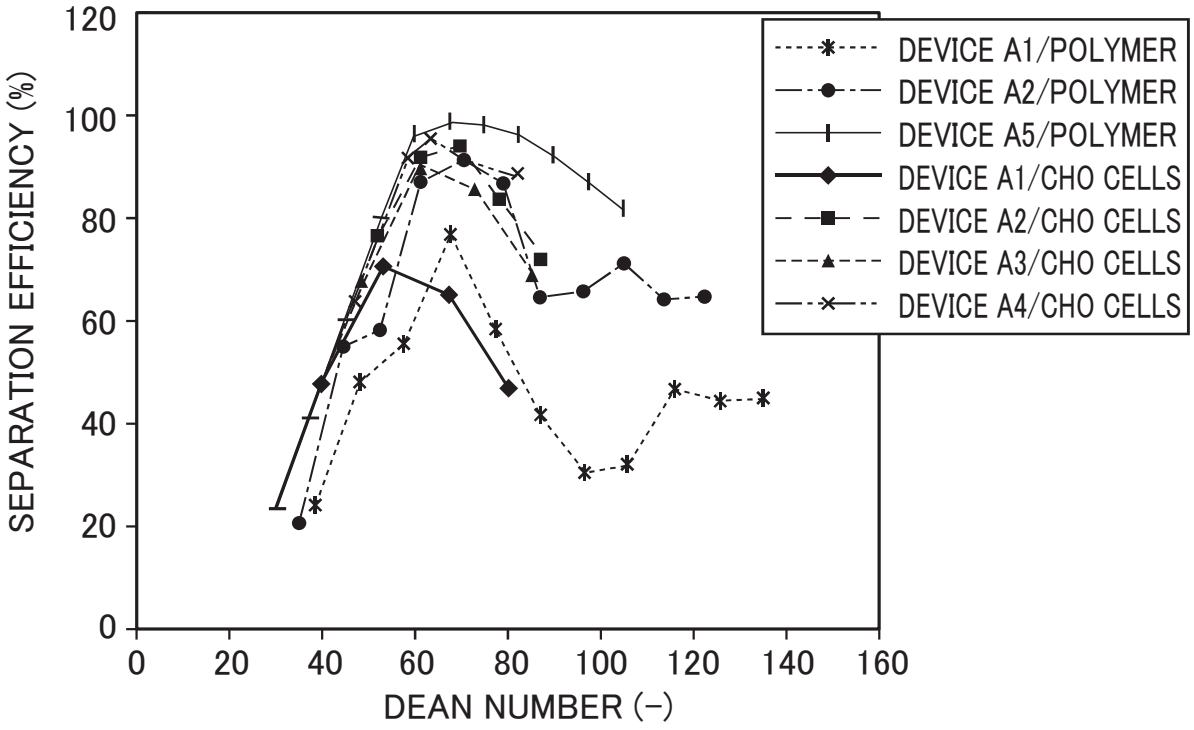
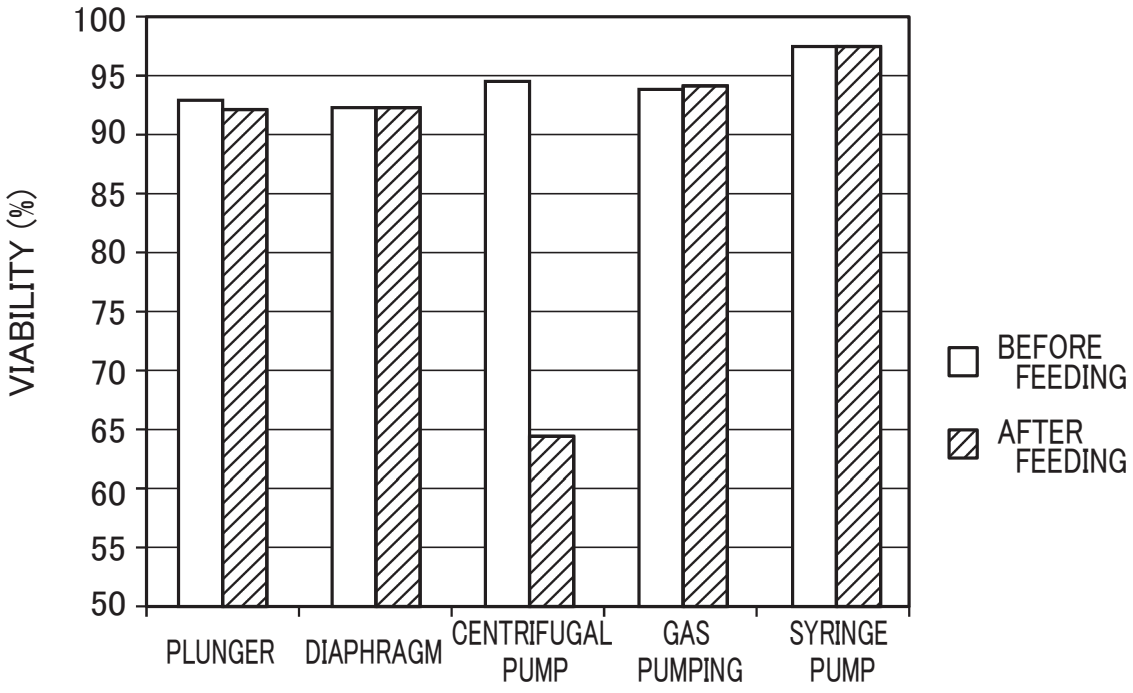

SEPARATION EFFICIENCY (%)
120
100
80
60
40
20
0
0
20
40
60
80
100
120
140
160
DEAN NUMBER (−)
DEVICE A1/POLYMER
DEVICE A2/POLYMER
DEVICE A5/POLYMER
DEVICE A1/CHO CELLS
DEVICE A2/CHO CELLS
DEVICE A3/CHO CELLS
DEVICE A4/CHO CELLS

FIG. 6


VIABILITY (%)
100
95
90
85
80
75
70
65
60
55
50
PLUNGER
DIAPHRAGM
CENTRIFUGAL PUMP
GAS PUMPING
SYRINGE PUMP
BEFORE FEEDING
AFTER FEEDING