Fig. 1

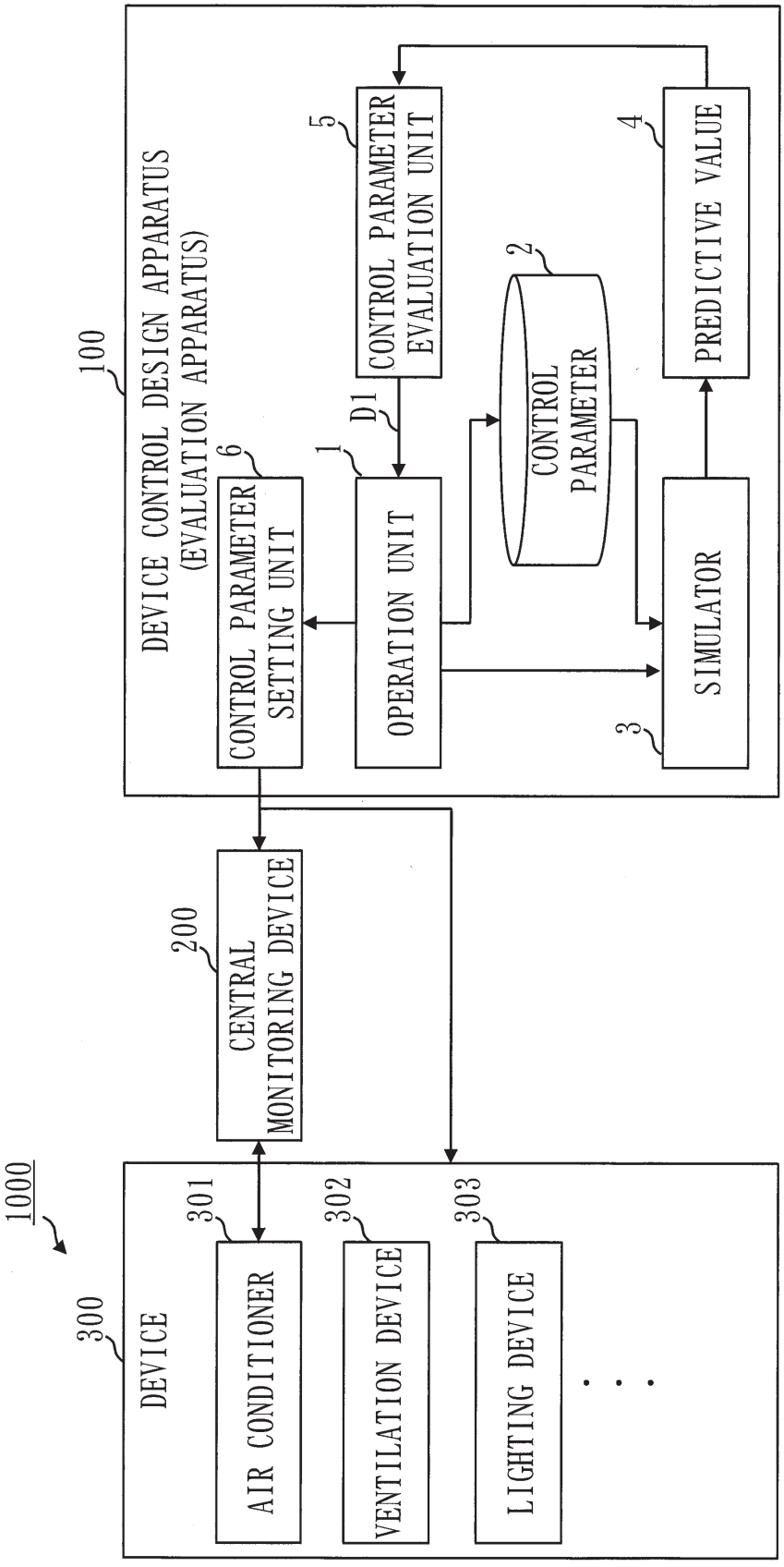

1000
100
DEVICE CONTROL DESIGN APPARATUS
(EVALUATION APPARATUS)
CONTROL PARAMETER
SETTING UNIT
6
OPERATION UNIT
1
D1
CONTROL PARAMETER
EVALUATION UNIT
5
CONTROL
PARAMETER
2
SIMULATOR
3
PREDICTIVE VALUE
4
200
CENTRAL
MONITORING DEVICE
300
DEVICE
301
AIR CONDITIONER
302
VENTILATION DEVICE
303
LIGHTING DEVICE
. . .

Fig. 2

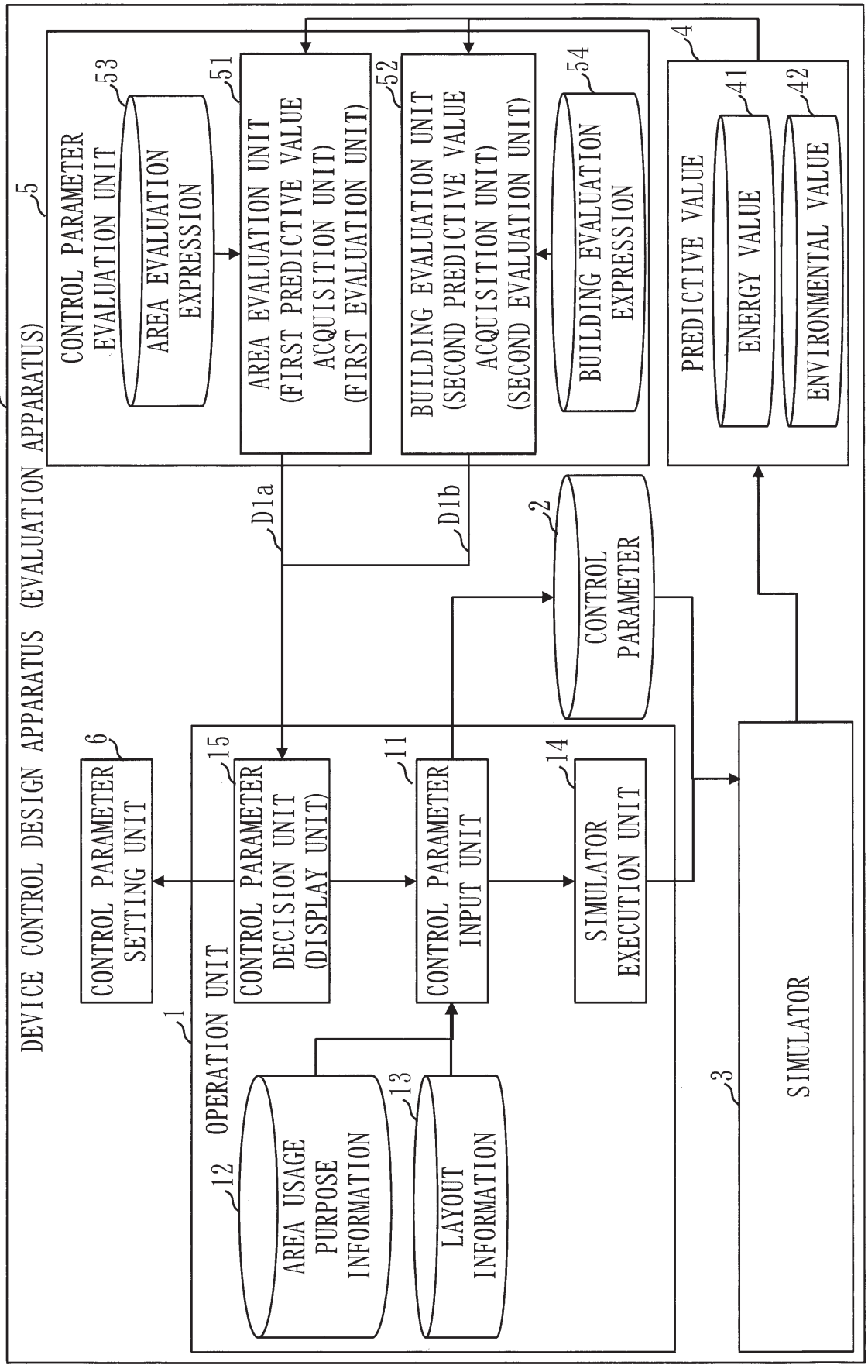

100
DEVICE CONTROL DESIGN APPARATUS (EVALUATION APPARATUS)
5
CONTROL PARAMETER EVALUATION UNIT
53
AREA EVALUATION EXPRESSION
51
AREA EVALUATION UNIT (FIRST PREDICTIVE VALUE ACQUISITION UNIT) (FIRST EVALUATION UNIT)
52
BUILDING EVALUATION UNIT (SECOND PREDICTIVE VALUE ACQUISITION UNIT) (SECOND EVALUATION UNIT)
54
BUILDING EVALUATION EXPRESSION
4
PREDICTIVE VALUE
41
ENERGY VALUE
42
ENVIRONMENTAL VALUE
D1a
D1b
2
CONTROL PARAMETER
6
CONTROL PARAMETER SETTING UNIT
15
CONTROL PARAMETER DECISION UNIT (DISPLAY UNIT)
11
CONTROL PARAMETER INPUT UNIT
14
SIMULATOR EXECUTION UNIT
1
OPERATION UNIT
12
AREA USAGE PURPOSE INFORMATION
13
LAYOUT INFORMATION
3
SIMULATOR

Fig. 3

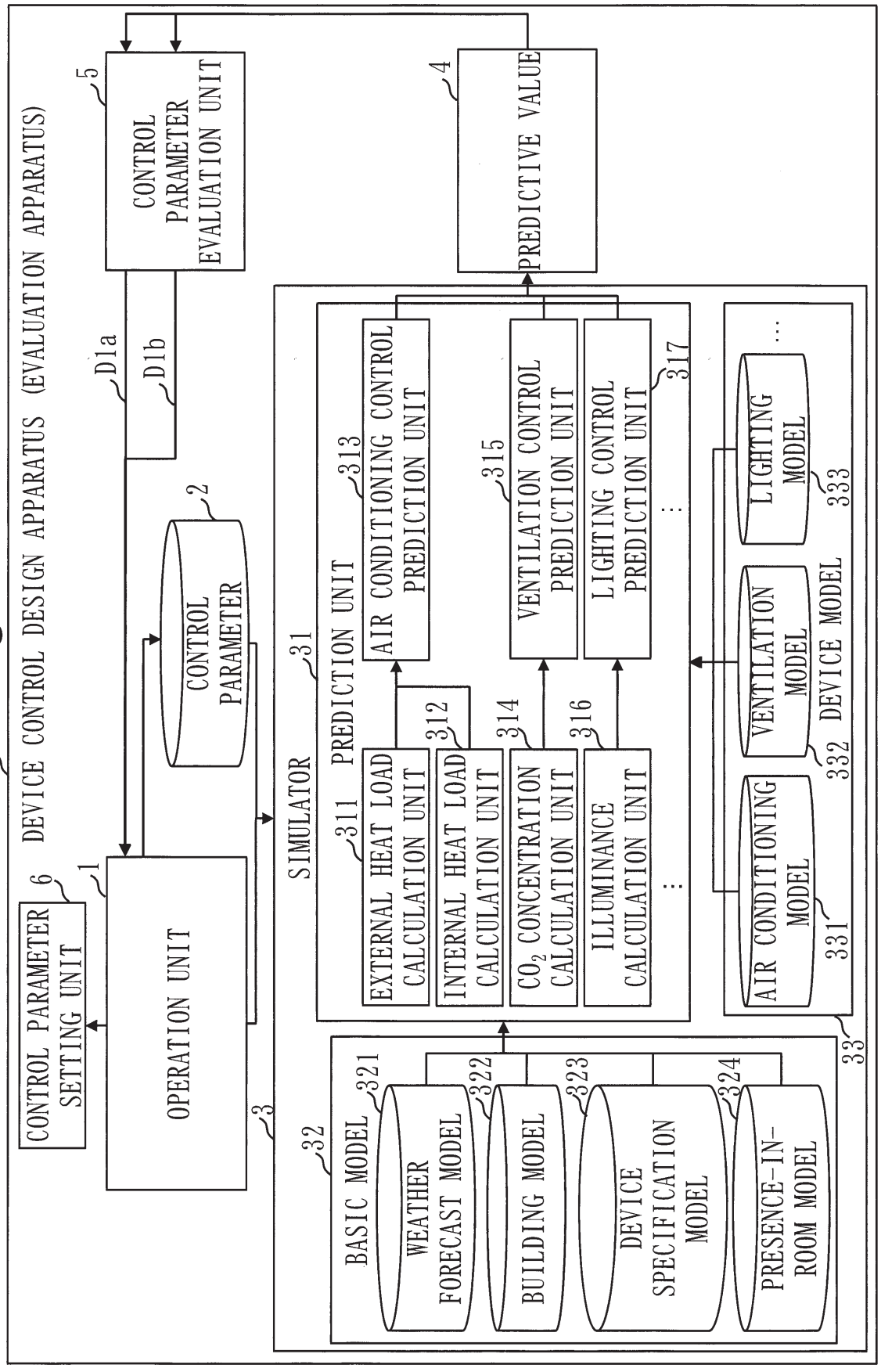

100 DEVICE CONTROL DESIGN APPARATUS (EVALUATION APPARATUS)
CONTROL PARAMETER SETTING UNIT
6
OPERATION UNIT
1
CONTROL PARAMETER
2
3
CONTROL PARAMETER EVALUATION UNIT
5
D1a
D1b
PREDICTIVE VALUE
4
SIMULATOR
31
PREDICTION UNIT
311 EXTERNAL HEAT LOAD CALCULATION UNIT
312 INTERNAL HEAT LOAD CALCULATION UNIT
313 AIR CONDITIONING CONTROL PREDICTION UNIT
314 CO_2 CONCENTRATION CALCULATION UNIT
315 VENTILATION CONTROL PREDICTION UNIT
316 ILLUMINANCE CALCULATION UNIT
317 LIGHTING CONTROL PREDICTION UNIT
32 BASIC MODEL
321 WEATHER FORECAST MODEL
322 BUILDING MODEL
323 DEVICE SPECIFICATION MODEL
324 PRESENCE-IN-ROOM MODEL
33 DEVICE MODEL
331 AIR CONDITIONING MODEL
332 VENTILATION MODEL
333 LIGHTING MODEL

Fig. 4

12

AREA USAGE PURPOSE CODE	AREA USAGE PURPOSE NAME
100	Focus
200	Relax
300	Meeting

Fig. 5

(a)

13

AREA ID	AREA NAME	AREA USAGE PURPOSE CODE	AREA POSITION
00001	Apple-1	100	(0, 0), (10, 0), (0, 10), (10, 10)
00002	Banana-1	200	(10, 0), (20, 10), (10, 10), (20, 10)
00003	Candy-1	300	(20, 0), (30, 0), (20, 10), (30, 10)

(b)

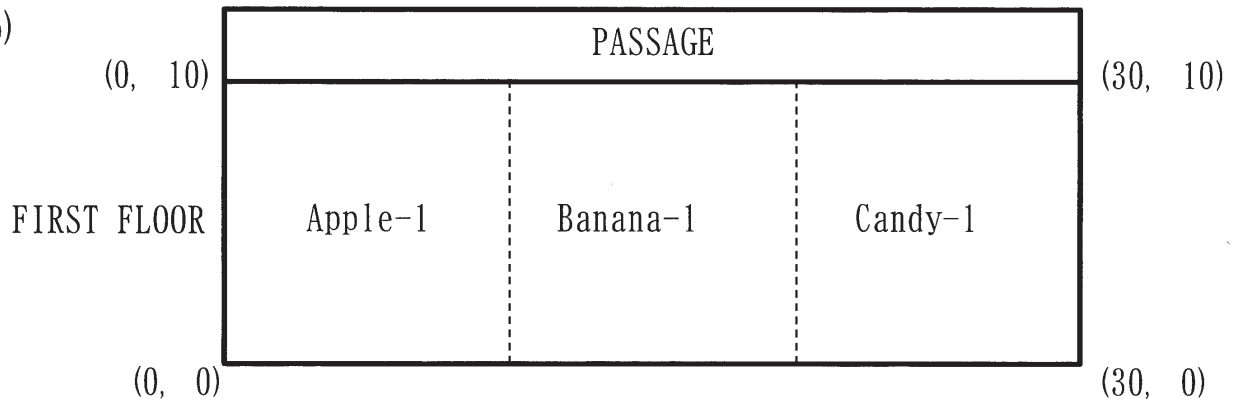


Fig. 6

53

AREA USAGE PURPOSE CODE	AREA USAGE PURPOSE BASED -EVALUATION EXPRESSION (SUMMER PERIOD)	AREA USAGE PURPOSE BASED -EVALUATION EXPRESSION (WINTER PERIOD)	AREA USAGE PURPOSE BASED -EVALUATION EXPRESSION (MIDTERM PERIOD)
100	TEMPERATURE: $25 \leq x1 < 26$ CO_2: $x2 < 800$ ILLUMINANCE: $700 \leq x3 < 800$	TEMPERATURE: $20 \leq T < 21$ CO_2: $x2 < 800$ ILLUMINANCE: $700 \leq x3 < 800$	TEMPERATURE: $25 \leq T < 26$ CO_2: $x2 < 800$ ILLUMINANCE: $700 \leq x3 < 800$
200	TEMPERATURE: $26 \leq x1 < 27$ CO_2: $x2 < 1000$ ILLUMINANCE: $300 \leq x3 < 500$	TEMPERATURE: $23 \leq x1 < 24$ CO_2: $x2 < 1000$ ILLUMINANCE: $300 \leq x3 < 500$	TEMPERATURE: $26 \leq x1 < 27$ CO_2: $x2 < 1000$ ILLUMINANCE: $300 \leq x3 < 500$
300	TEMPERATURE: $24 \leq x1 < 25$ CO_2: $x2 < 1500$ ILLUMINANCE: $800 \leq x3 < 1000$	TEMPERATURE: $22 \leq x1 < 23$ CO_2: $x2 < 1500$ ILLUMINANCE: $800 \leq x3 < 1000$	TEMPERATURE: $24 \leq x1 < 25$ CO_2: $x2 < 1500$ ILLUMINANCE: $800 \leq x3 < 1000$

Fig. 7

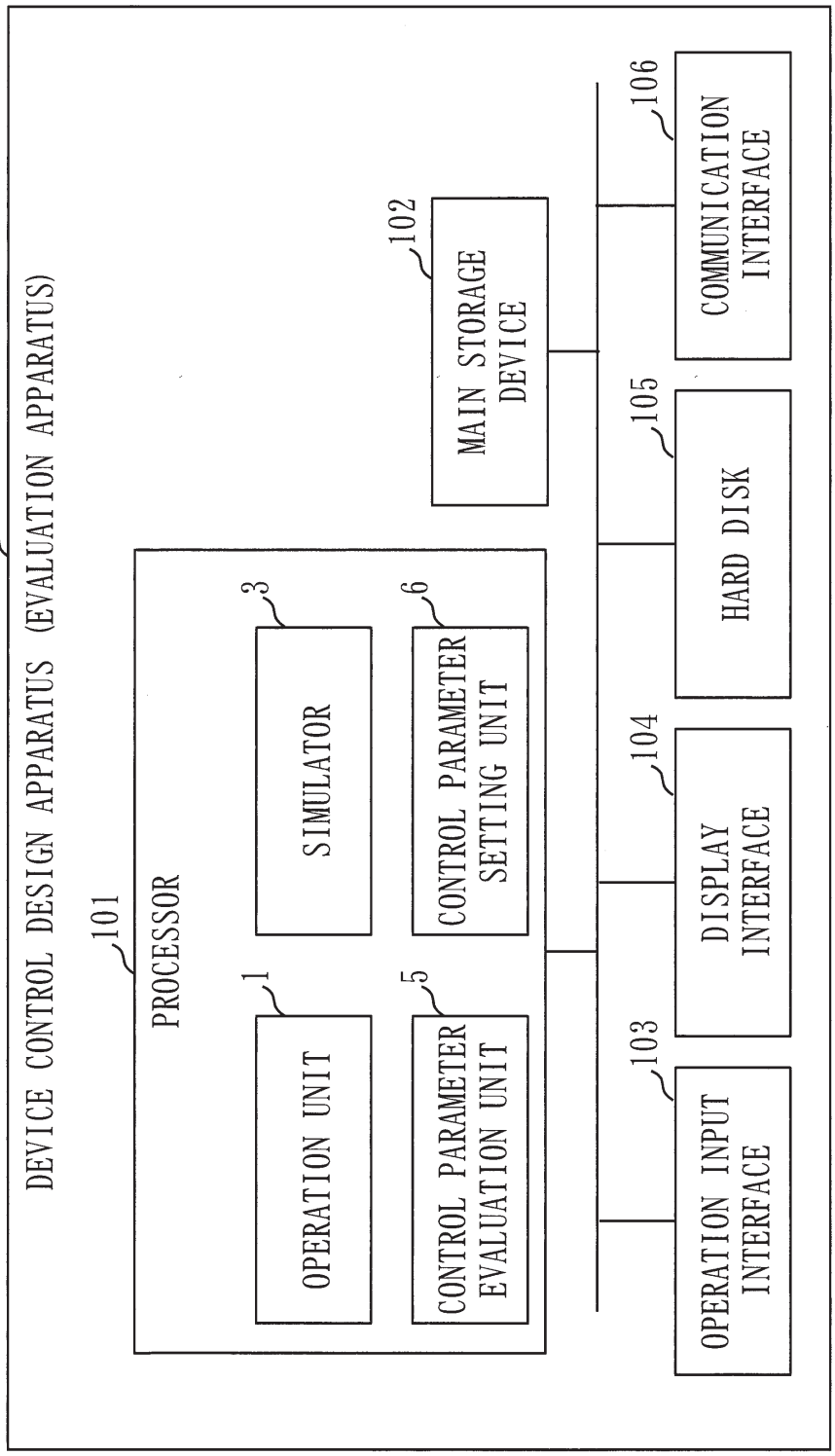

100
DEVICE CONTROL DESIGN APPARATUS (EVALUATION APPARATUS)
101
PROCESSOR
1
OPERATION UNIT
3
SIMULATOR
5
CONTROL PARAMETER EVALUATION UNIT
6
CONTROL PARAMETER SETTING UNIT
102
MAIN STORAGE DEVICE
103
OPERATION INPUT INTERFACE
104
DISPLAY INTERFACE
105
HARD DISK
106
COMMUNICATION INTERFACE

Fig. 8

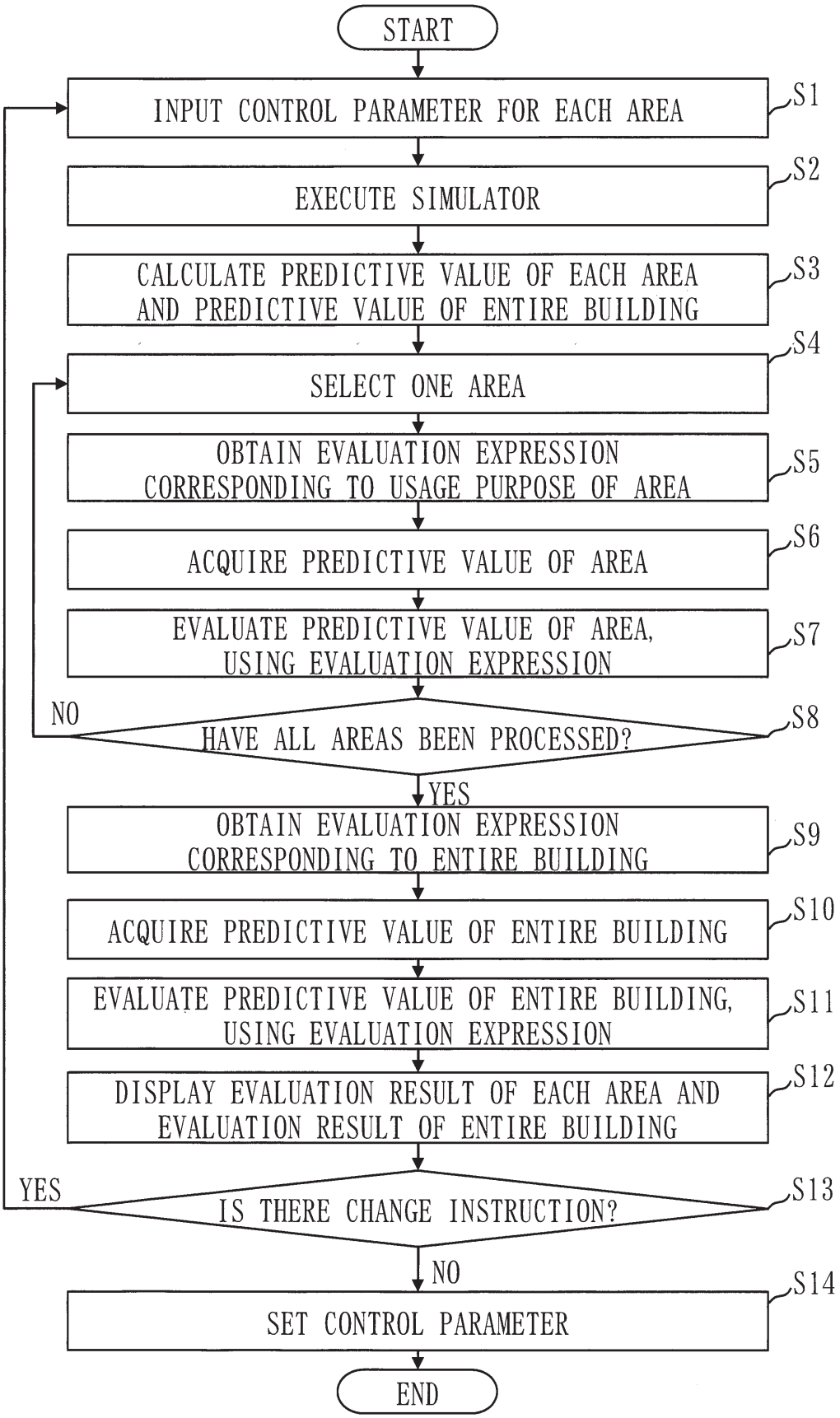

START
INPUT CONTROL PARAMETER FOR EACH AREA
S1
EXECUTE SIMULATOR
S2
CALCULATE PREDICTIVE VALUE OF EACH AREA AND PREDICTIVE VALUE OF ENTIRE BUILDING
S3
SELECT ONE AREA
S4
OBTAIN EVALUATION EXPRESSION CORRESPONDING TO USAGE PURPOSE OF AREA
S5
ACQUIRE PREDICTIVE VALUE OF AREA
S6
EVALUATE PREDICTIVE VALUE OF AREA, USING EVALUATION EXPRESSION
S7
NO
HAVE ALL AREAS BEEN PROCESSED?
S8
YES
OBTAIN EVALUATION EXPRESSION CORRESPONDING TO ENTIRE BUILDING
S9
ACQUIRE PREDICTIVE VALUE OF ENTIRE BUILDING
S10
EVALUATE PREDICTIVE VALUE OF ENTIRE BUILDING, USING EVALUATION EXPRESSION
S11
DISPLAY EVALUATION RESULT OF EACH AREA AND EVALUATION RESULT OF ENTIRE BUILDING
S12
YES
IS THERE CHANGE INSTRUCTION?
S13
NO
SET CONTROL PARAMETER
S14
END

Fig. 9

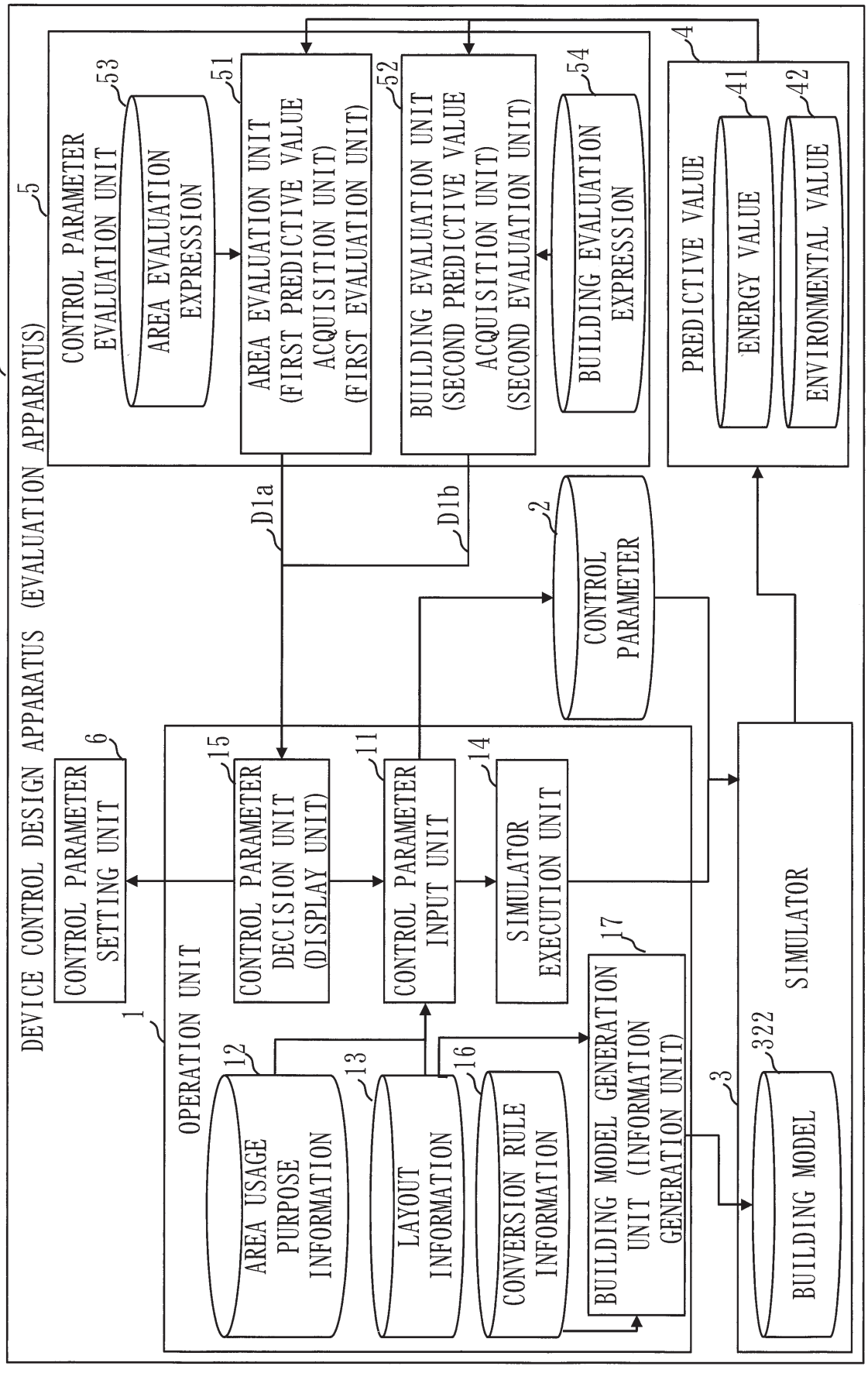

100
DEVICE CONTROL DESIGN APPARATUS (EVALUATION APPARATUS)
5
CONTROL PARAMETER EVALUATION UNIT
53
AREA EVALUATION EXPRESSION
51
AREA EVALUATION UNIT (FIRST PREDICTIVE VALUE ACQUISITION UNIT) (FIRST EVALUATION UNIT)
52
BUILDING EVALUATION UNIT (SECOND PREDICTIVE VALUE ACQUISITION UNIT) (SECOND EVALUATION UNIT)
54
BUILDING EVALUATION EXPRESSION
4
PREDICTIVE VALUE
41
ENERGY VALUE
42
ENVIRONMENTAL VALUE
D1a
D1b
2
CONTROL PARAMETER
1
OPERATION UNIT
6
CONTROL PARAMETER SETTING UNIT
15
CONTROL PARAMETER DECISION UNIT (DISPLAY UNIT)
11
CONTROL PARAMETER INPUT UNIT
14
SIMULATOR EXECUTION UNIT
12
AREA USAGE PURPOSE INFORMATION
13
LAYOUT INFORMATION
16
CONVERSION RULE INFORMATION
17
BUILDING MODEL GENERATION UNIT (INFORMATION GENERATION UNIT)
3
SIMULATOR
322
BUILDING MODEL

Fig. 10

16

CONVERSION RULE ID	CONVERSION RULE
1	WHEN THERE ARE ADJACENT AREAS, WALL THICKNESS BETWEEN ADJACENT AREAS IS 0
2	FOR AREA ADJACENT TO WALL SURFACE, WALL THICKNESS AND WALL MATERIAL USE INFORMATION ON WALL SURFACE
3	FOR WALL LENGTH AND WALL HEIGHT, DISTANCE BETWEEN VERTICES OF GIS COORDINATES IS USED

Fig. 11

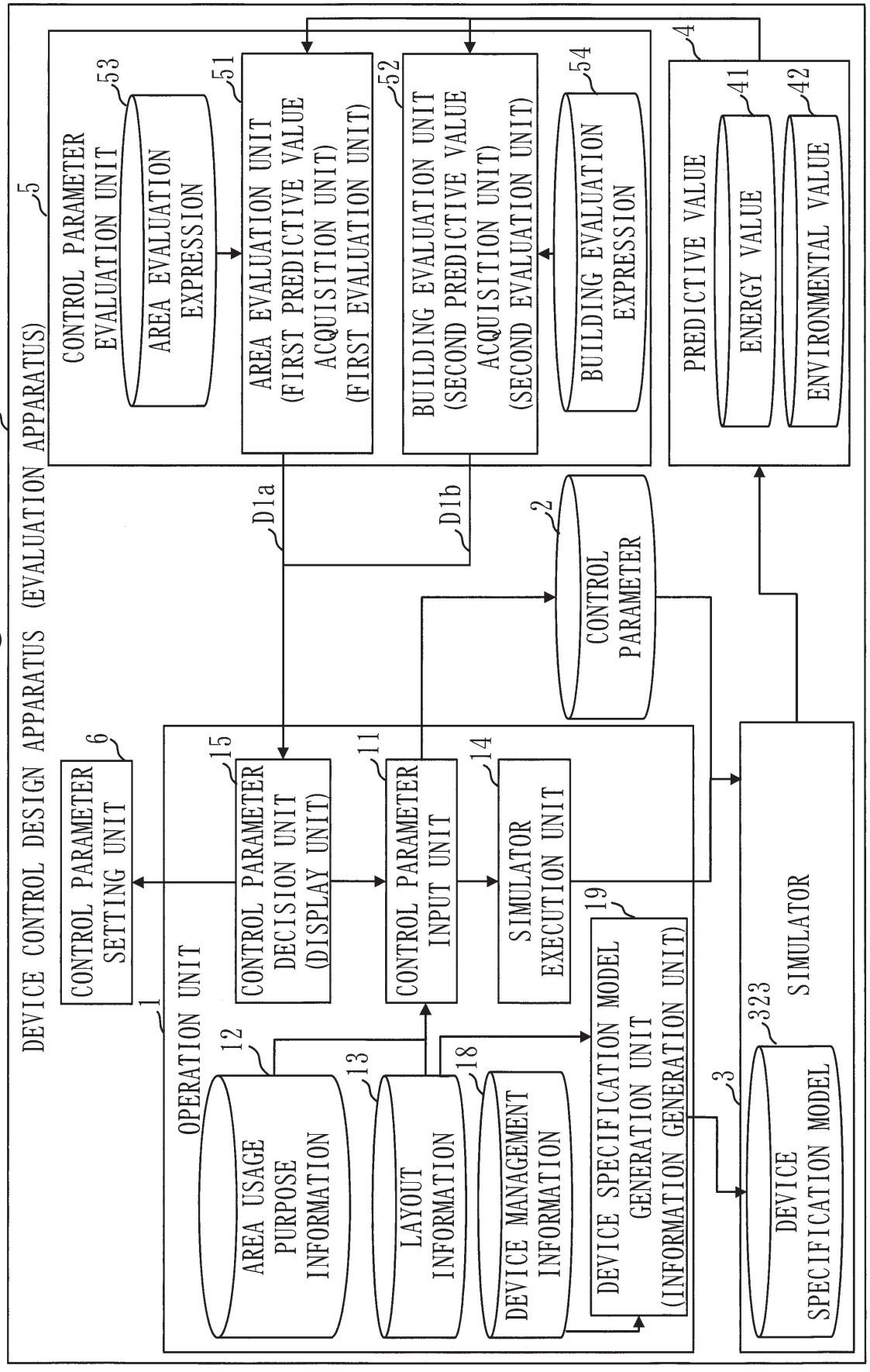

100
DEVICE CONTROL DESIGN APPARATUS (EVALUATION APPARATUS)
5
CONTROL PARAMETER EVALUATION UNIT
53
AREA EVALUATION EXPRESSION
51
AREA EVALUATION UNIT (FIRST PREDICTIVE VALUE ACQUISITION UNIT) (FIRST EVALUATION UNIT)
52
BUILDING EVALUATION UNIT (SECOND PREDICTIVE VALUE ACQUISITION UNIT) (SECOND EVALUATION UNIT)
54
BUILDING EVALUATION EXPRESSION
4
PREDICTIVE VALUE
41
ENERGY VALUE
42
ENVIRONMENTAL VALUE
D1a
D1b
2
CONTROL PARAMETER
6
CONTROL PARAMETER SETTING UNIT
15
CONTROL PARAMETER DECISION UNIT (DISPLAY UNIT)
11
CONTROL PARAMETER INPUT UNIT
14
SIMULATOR EXECUTION UNIT
1
OPERATION UNIT
12
AREA USAGE PURPOSE INFORMATION
13
LAYOUT INFORMATION
18
DEVICE MANAGEMENT INFORMATION
19
DEVICE SPECIFICATION MODEL GENERATION UNIT (INFORMATION GENERATION UNIT)
3
323
SIMULATOR
DEVICE SPECIFICATION MODEL

Fig. 12

18

DEVICE ID	DEVICE NAME	DEVICE CLASSIFICATION	DEVICE MODEL NUMBER	DEVICE SERIAL NUMBER	DEVICE INSTALLATION POSITION	PHOTOGRAPH OF DEVICE INSTALLATION STATUS
00001	FIRST FLOOR EAST SIDE AIR CONDITIONER 1	AIR CONDITIONER INDOOR UNIT	AA111	A1234567	(3, 8)	(OMITTED)
00002	FIRST FLOOR EAST SIDE AIR CONDITIONER 2	AIR CONDITIONER INDOOR UNIT	AA111	A1234568	(8, 8)	(OMITTED)
00003	FIRST FLOOR WEST SIDE AIR CONDITIONER 1	AIR CONDITIONER INDOOR UNIT	AA111	A1234569	(3, 3)	(OMITTED)
...	...	...	...	...	...	...

Fig. 13

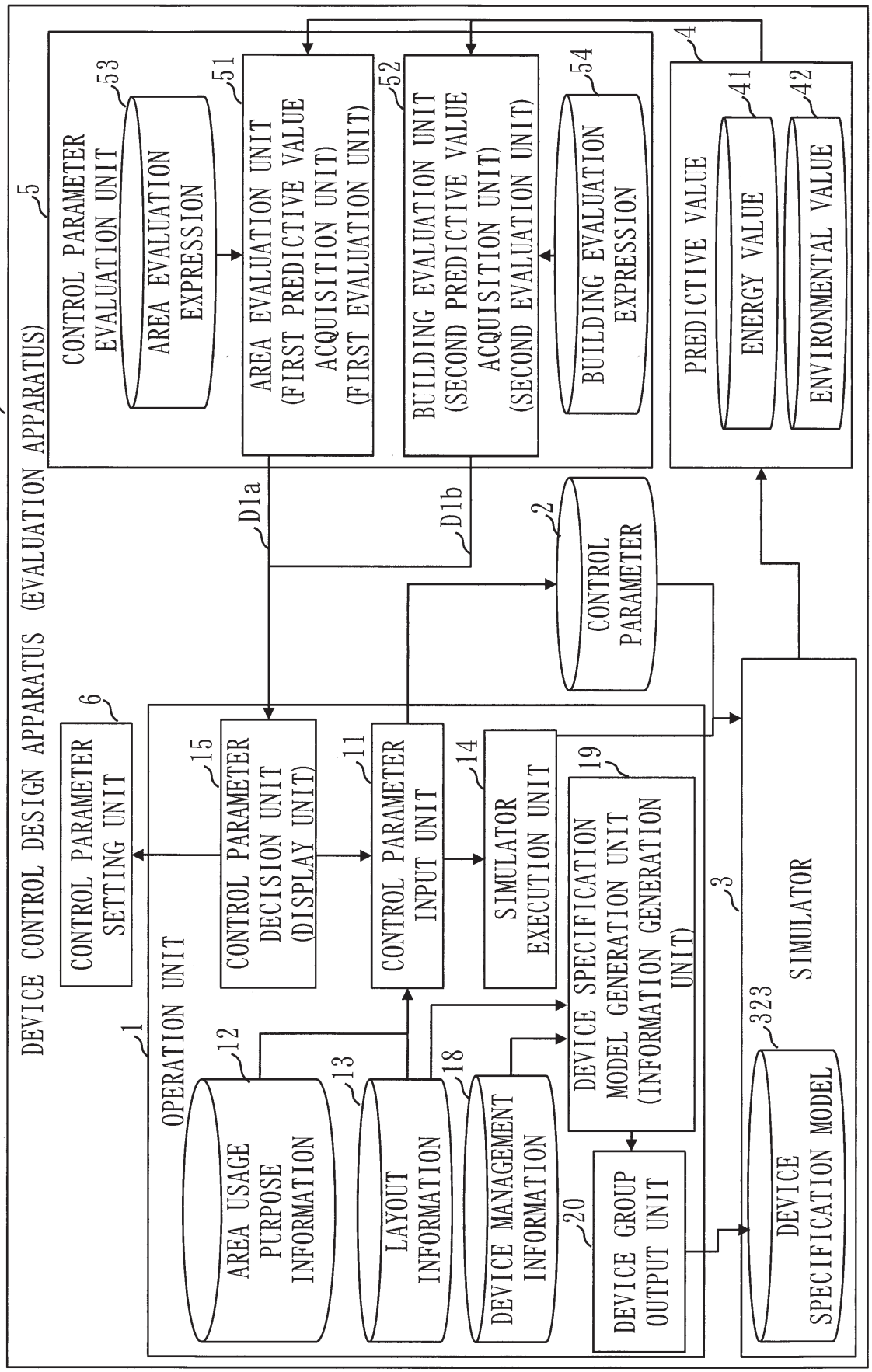

100
DEVICE CONTROL DESIGN APPARATUS (EVALUATION APPARATUS)
5
CONTROL PARAMETER EVALUATION UNIT
53
AREA EVALUATION EXPRESSION
51
AREA EVALUATION UNIT (FIRST PREDICTIVE VALUE ACQUISITION UNIT) (FIRST EVALUATION UNIT)
52
BUILDING EVALUATION UNIT (SECOND PREDICTIVE VALUE ACQUISITION UNIT) (SECOND EVALUATION UNIT)
54
BUILDING EVALUATION EXPRESSION
4
PREDICTIVE VALUE
41
ENERGY VALUE
42
ENVIRONMENTAL VALUE
D1a
D1b
2
CONTROL PARAMETER
6
CONTROL PARAMETER SETTING UNIT
15
CONTROL PARAMETER DECISION UNIT (DISPLAY UNIT)
11
CONTROL PARAMETER INPUT UNIT
14
SIMULATOR EXECUTION UNIT
19
DEVICE SPECIFICATION MODEL GENERATION UNIT (INFORMATION GENERATION UNIT)
1
OPERATION UNIT
12
AREA USAGE PURPOSE INFORMATION
13
LAYOUT INFORMATION
18
DEVICE MANAGEMENT INFORMATION
20
DEVICE GROUP OUTPUT UNIT
3
SIMULATOR
323
DEVICE SPECIFICATION MODEL

Fig. 14

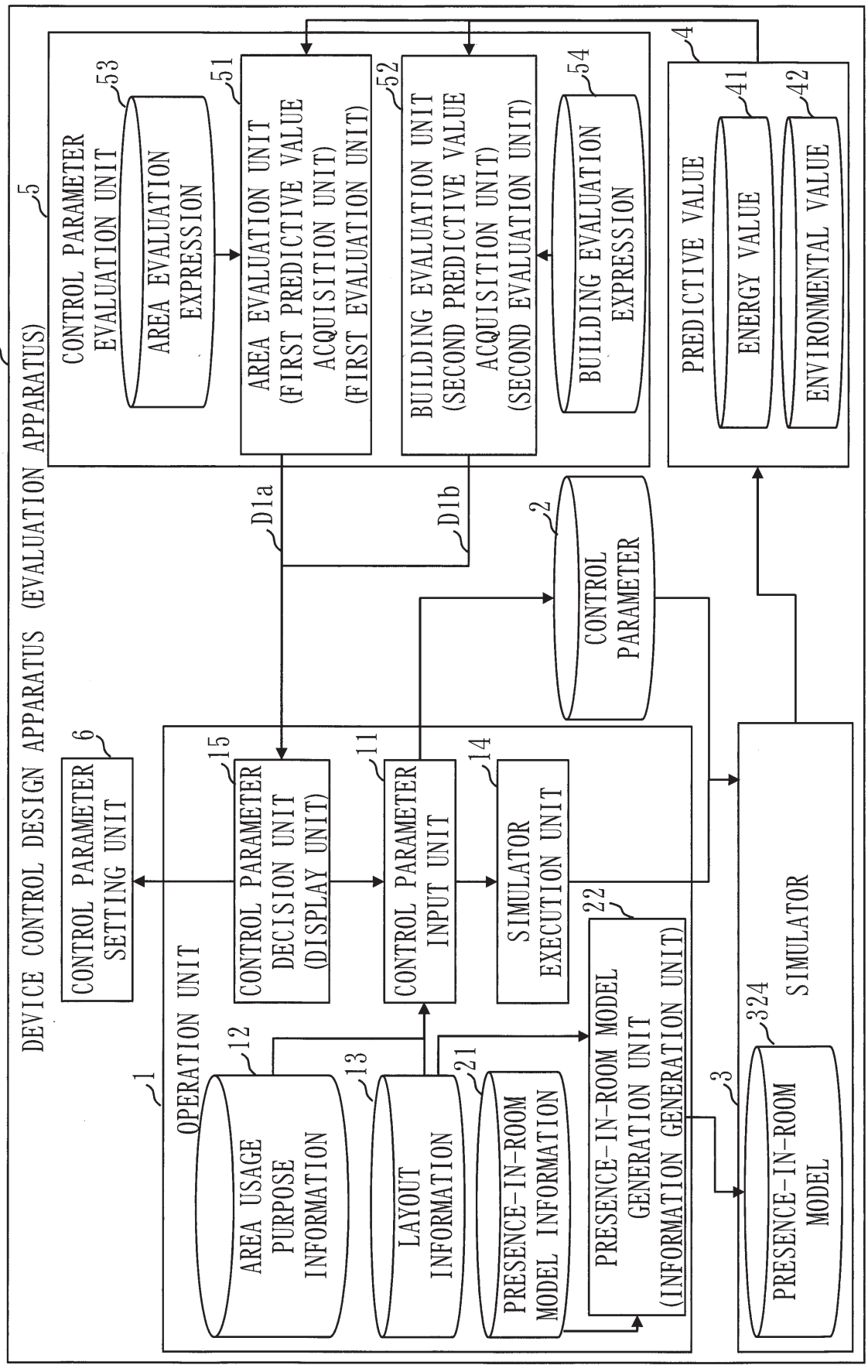

100
DEVICE CONTROL DESIGN APPARATUS (EVALUATION APPARATUS)
5
CONTROL PARAMETER EVALUATION UNIT
53
AREA EVALUATION EXPRESSION
51
AREA EVALUATION UNIT (FIRST PREDICTIVE VALUE ACQUISITION UNIT) (FIRST EVALUATION UNIT)
52
BUILDING EVALUATION UNIT (SECOND PREDICTIVE VALUE ACQUISITION UNIT) (SECOND EVALUATION UNIT)
54
BUILDING EVALUATION EXPRESSION
4
PREDICTIVE VALUE
41
ENERGY VALUE
42
ENVIRONMENTAL VALUE
D1a
D1b
2
CONTROL PARAMETER
6
CONTROL PARAMETER SETTING UNIT
15
CONTROL PARAMETER DECISION UNIT (DISPLAY UNIT)
11
CONTROL PARAMETER INPUT UNIT
14
SIMULATOR EXECUTION UNIT
1
OPERATION UNIT
12
AREA USAGE PURPOSE INFORMATION
13
LAYOUT INFORMATION
21
PRESENCE-IN-ROOM MODEL INFORMATION
22
PRESENCE-IN-ROOM MODEL GENERATION UNIT (INFORMATION GENERATION UNIT)
3
324
SIMULATOR
PRESENCE-IN-ROOM MODEL

Fig. 15

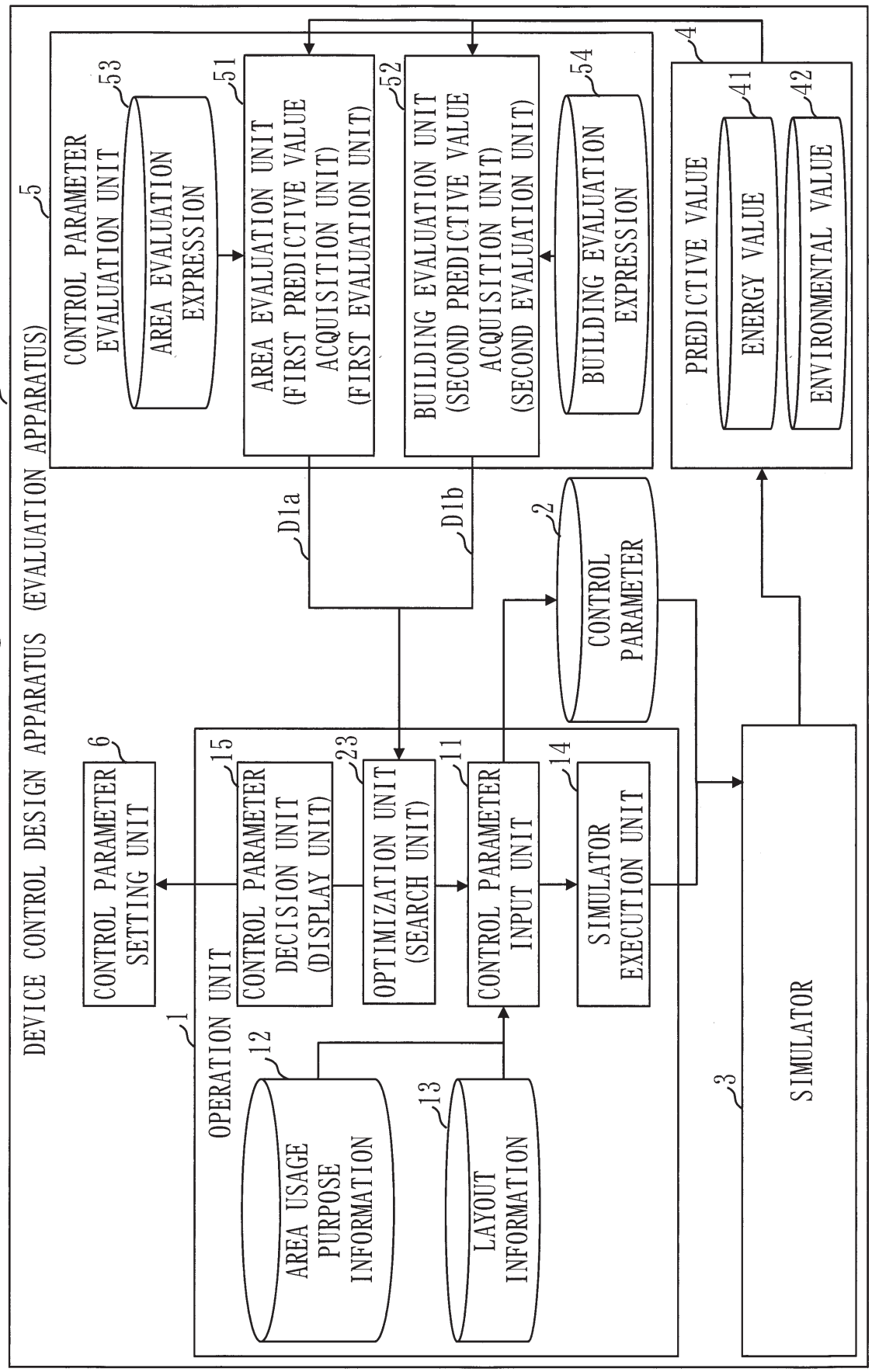

100
DEVICE CONTROL DESIGN APPARATUS (EVALUATION APPARATUS)
5
CONTROL PARAMETER EVALUATION UNIT
53
AREA EVALUATION EXPRESSION
51
AREA EVALUATION UNIT (FIRST PREDICTIVE VALUE ACQUISITION UNIT) (FIRST EVALUATION UNIT)
52
BUILDING EVALUATION UNIT (SECOND PREDICTIVE VALUE ACQUISITION UNIT) (SECOND EVALUATION UNIT)
54
BUILDING EVALUATION EXPRESSION
4
PREDICTIVE VALUE
41
ENERGY VALUE
42
ENVIRONMENTAL VALUE
D1a
D1b
2
CONTROL PARAMETER
6
CONTROL PARAMETER SETTING UNIT
15
CONTROL PARAMETER DECISION UNIT (DISPLAY UNIT)
23
OPTIMIZATION UNIT (SEARCH UNIT)
11
CONTROL PARAMETER INPUT UNIT
14
SIMULATOR EXECUTION UNIT
1
OPERATION UNIT
12
AREA USAGE PURPOSE INFORMATION
13
LAYOUT INFORMATION
3
SIMULATOR

Fig. 16

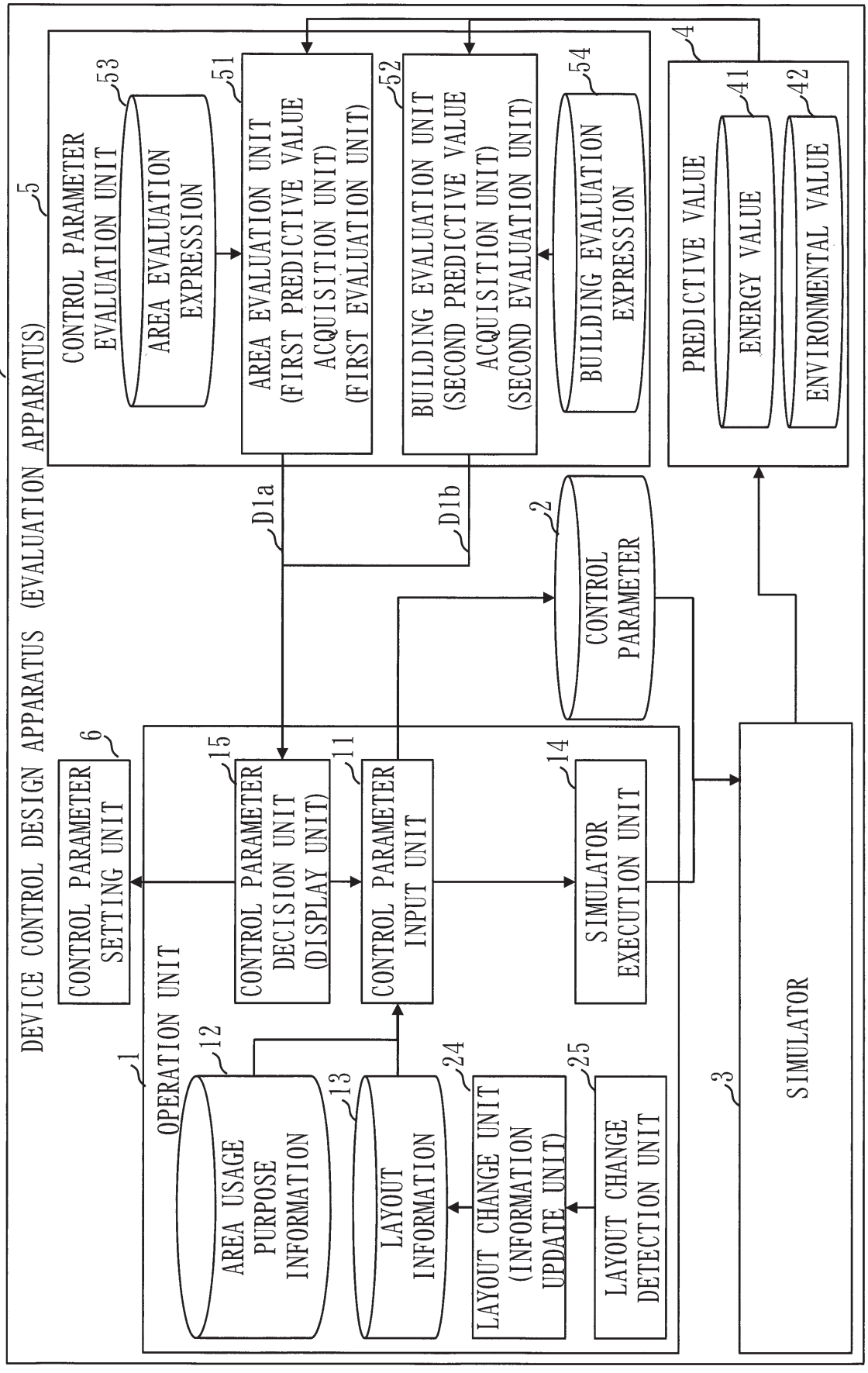
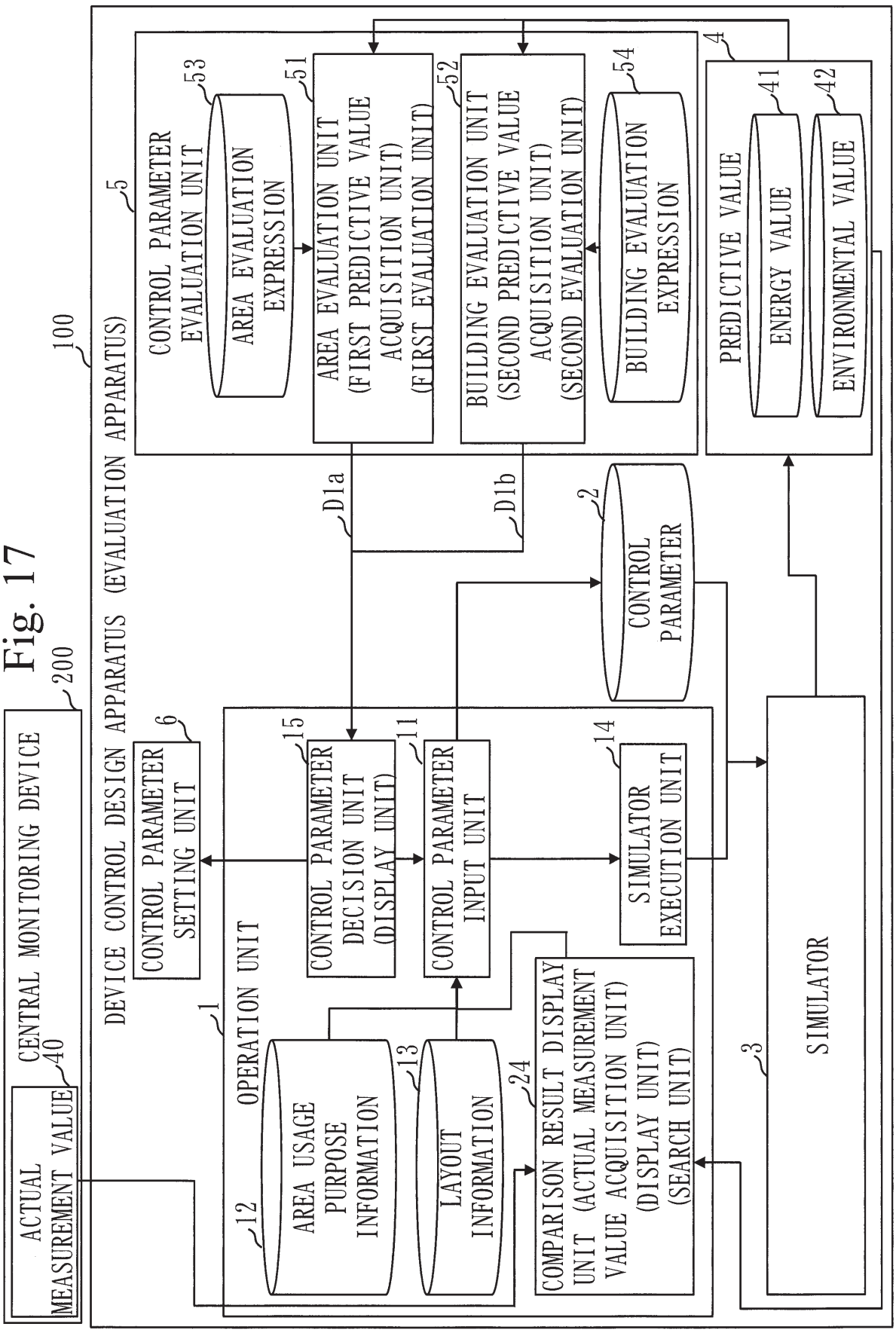

100
DEVICE CONTROL DESIGN APPARATUS (EVALUATION APPARATUS)
5
CONTROL PARAMETER EVALUATION UNIT
53
AREA EVALUATION EXPRESSION
51
AREA EVALUATION UNIT (FIRST PREDICTIVE VALUE ACQUISITION UNIT) (FIRST EVALUATION UNIT)
52
BUILDING EVALUATION UNIT (SECOND PREDICTIVE VALUE ACQUISITION UNIT) (SECOND EVALUATION UNIT)
54
BUILDING EVALUATION EXPRESSION
4
PREDICTIVE VALUE
41
ENERGY VALUE
42
ENVIRONMENTAL VALUE
D1a
D1b
2
CONTROL PARAMETER
6
CONTROL PARAMETER SETTING UNIT
15
CONTROL PARAMETER DECISION UNIT (DISPLAY UNIT)
11
CONTROL PARAMETER INPUT UNIT
14
SIMULATOR EXECUTION UNIT
1
OPERATION UNIT
12
AREA USAGE PURPOSE INFORMATION
13
LAYOUT INFORMATION
24
LAYOUT CHANGE UNIT (INFORMATION UPDATE UNIT)
25
LAYOUT CHANGE DETECTION UNIT
3
SIMULATOR

Fig. 17


100
DEVICE CONTROL DESIGN APPARATUS (EVALUATION APPARATUS)
200
CENTRAL MONITORING DEVICE
ACTUAL MEASUREMENT VALUE
40
OPERATION UNIT
1
CONTROL PARAMETER SETTING UNIT
6
CONTROL PARAMETER DECISION UNIT (DISPLAY UNIT)
15
CONTROL PARAMETER INPUT UNIT
11
SIMULATOR EXECUTION UNIT
14
AREA USAGE PURPOSE INFORMATION
12
LAYOUT INFORMATION
13
COMPARISON RESULT DISPLAY UNIT (ACTUAL MEASUREMENT VALUE ACQUISITION UNIT) (DISPLAY UNIT) (SEARCH UNIT)
24
CONTROL PARAMETER EVALUATION UNIT
5
AREA EVALUATION EXPRESSION
53
AREA EVALUATION UNIT (FIRST PREDICTIVE VALUE ACQUISITION UNIT) (FIRST EVALUATION UNIT)
51
BUILDING EVALUATION UNIT (SECOND PREDICTIVE VALUE ACQUISITION UNIT) (SECOND EVALUATION UNIT)
52
BUILDING EVALUATION EXPRESSION
54
D1a
D1b
CONTROL PARAMETER
2
PREDICTIVE VALUE
4
ENERGY VALUE
41
ENVIRONMENTAL VALUE
42
SIMULATOR
3