FIG.1

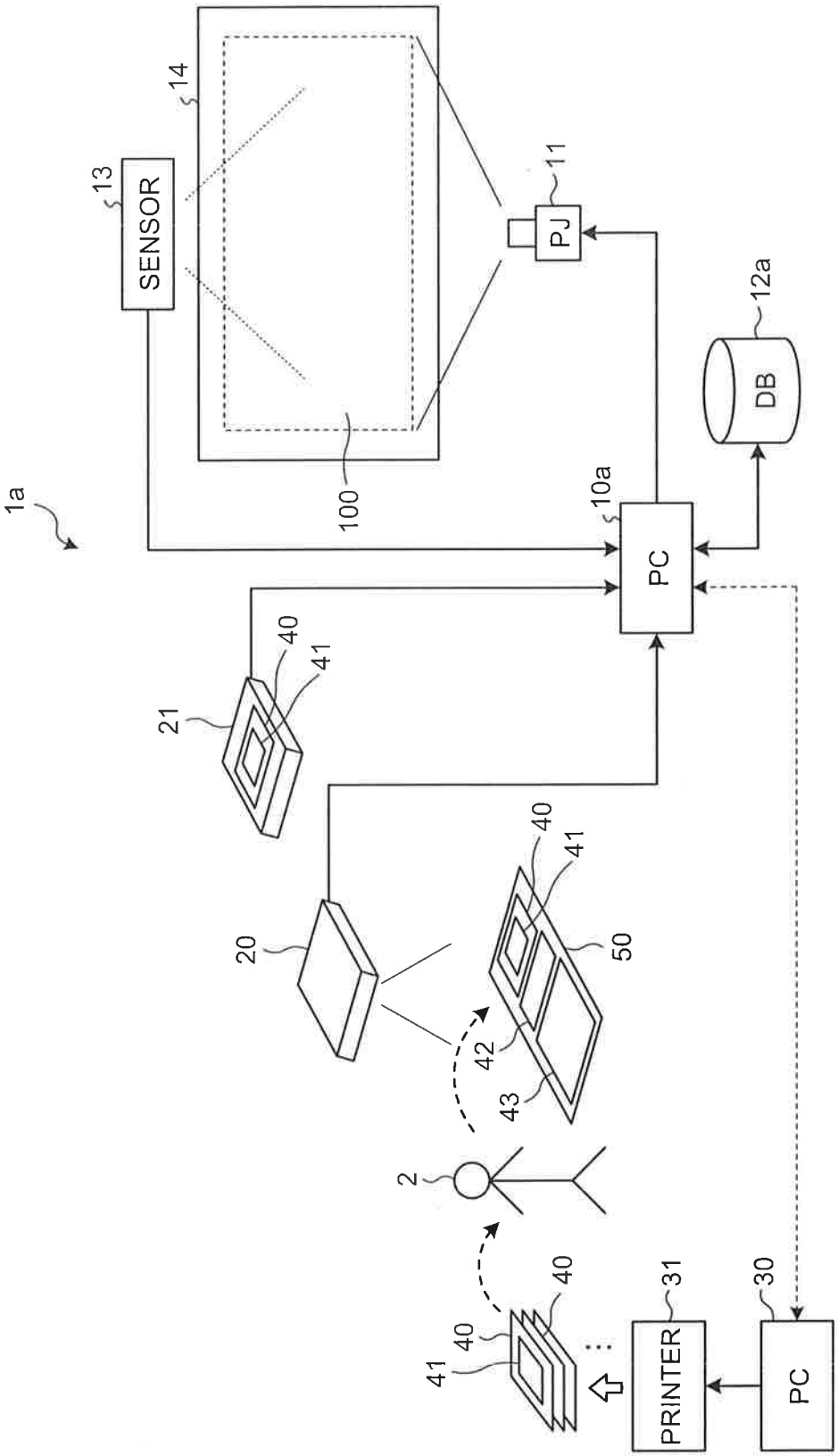

1a
13
SENSOR
14
100
11
PJ
12a
DB
10a
PC
21
40
41
20
50
42
43
2
40
41
40
41
PRINTER
31
30
PC

FIG.2

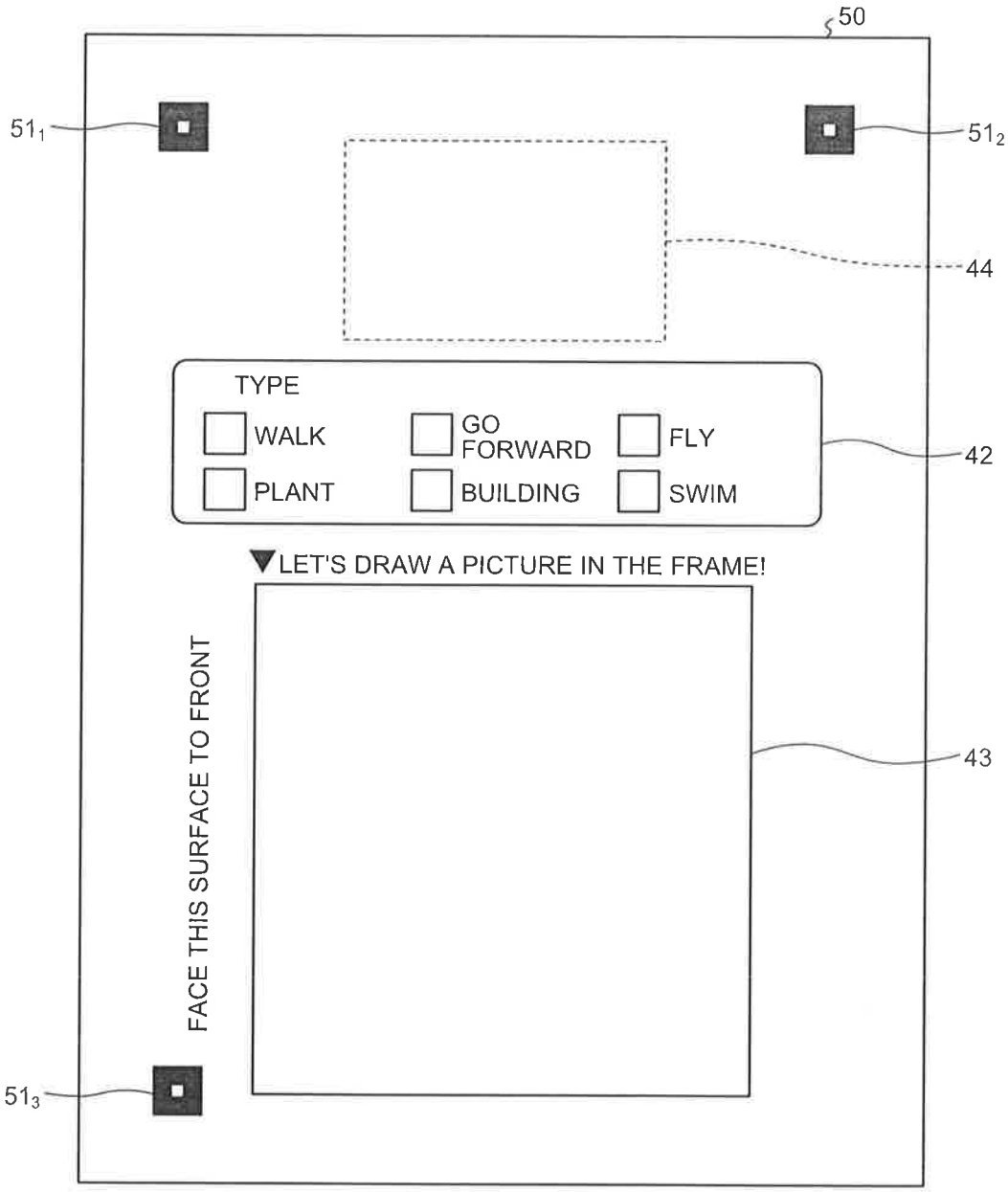

50
51₁
51₂
44
TYPE
WALK
GO FORWARD
FLY
PLANT
BUILDING
SWIM
42
LET'S DRAW A PICTURE IN THE FRAME!
FACE THIS SURFACE TO FRONT
43
51₃

FIG.3

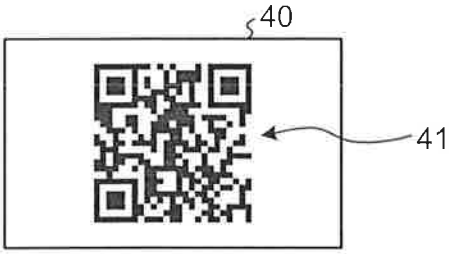


FIG.4

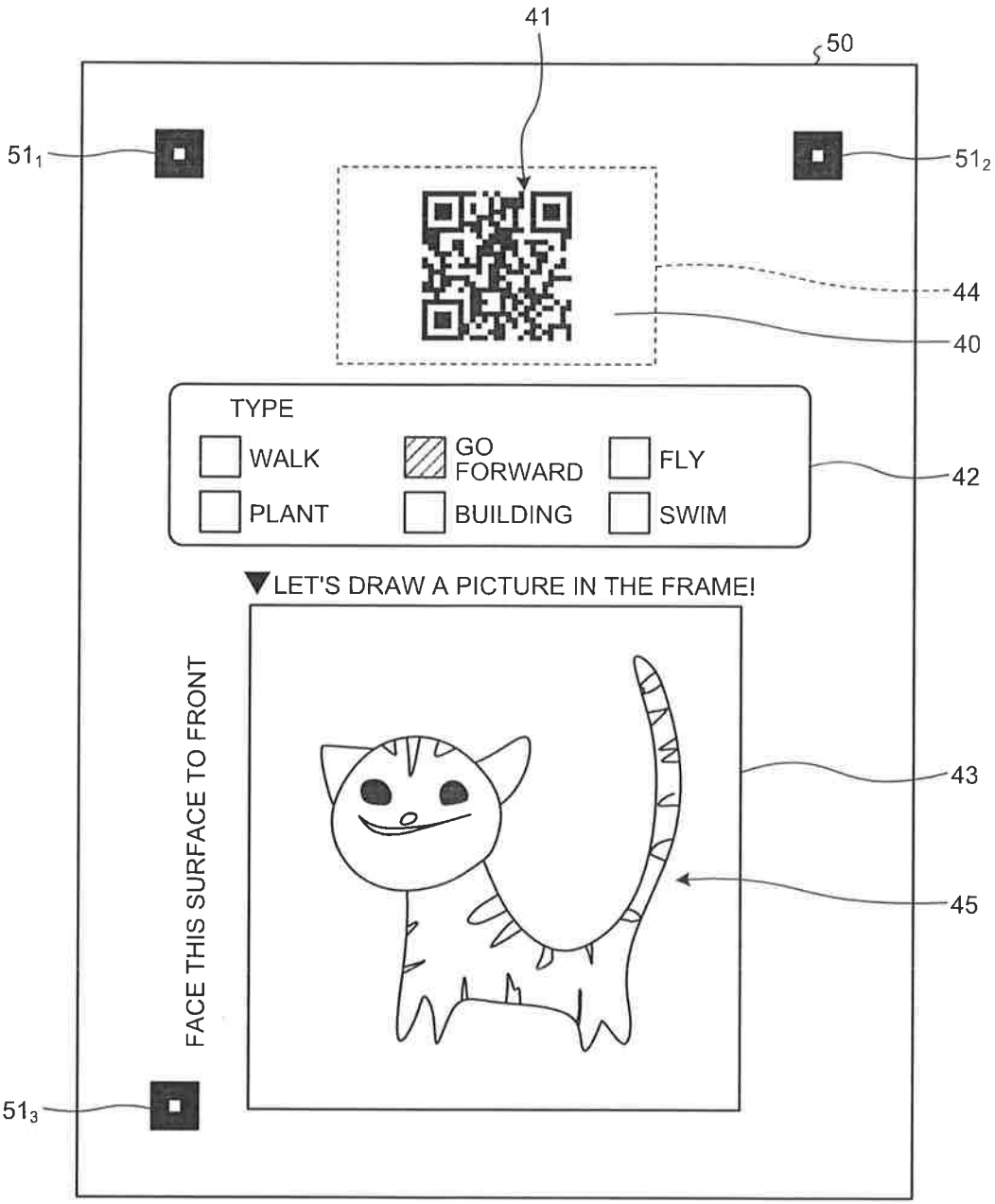

41
50
51_1
51_2
44
40
TYPE
WALK
GO FORWARD
FLY
PLANT
BUILDING
SWIM
42
LET'S DRAW A PICTURE IN THE FRAME!
FACE THIS SURFACE TO FRONT
43
45
51_3

FIG.5

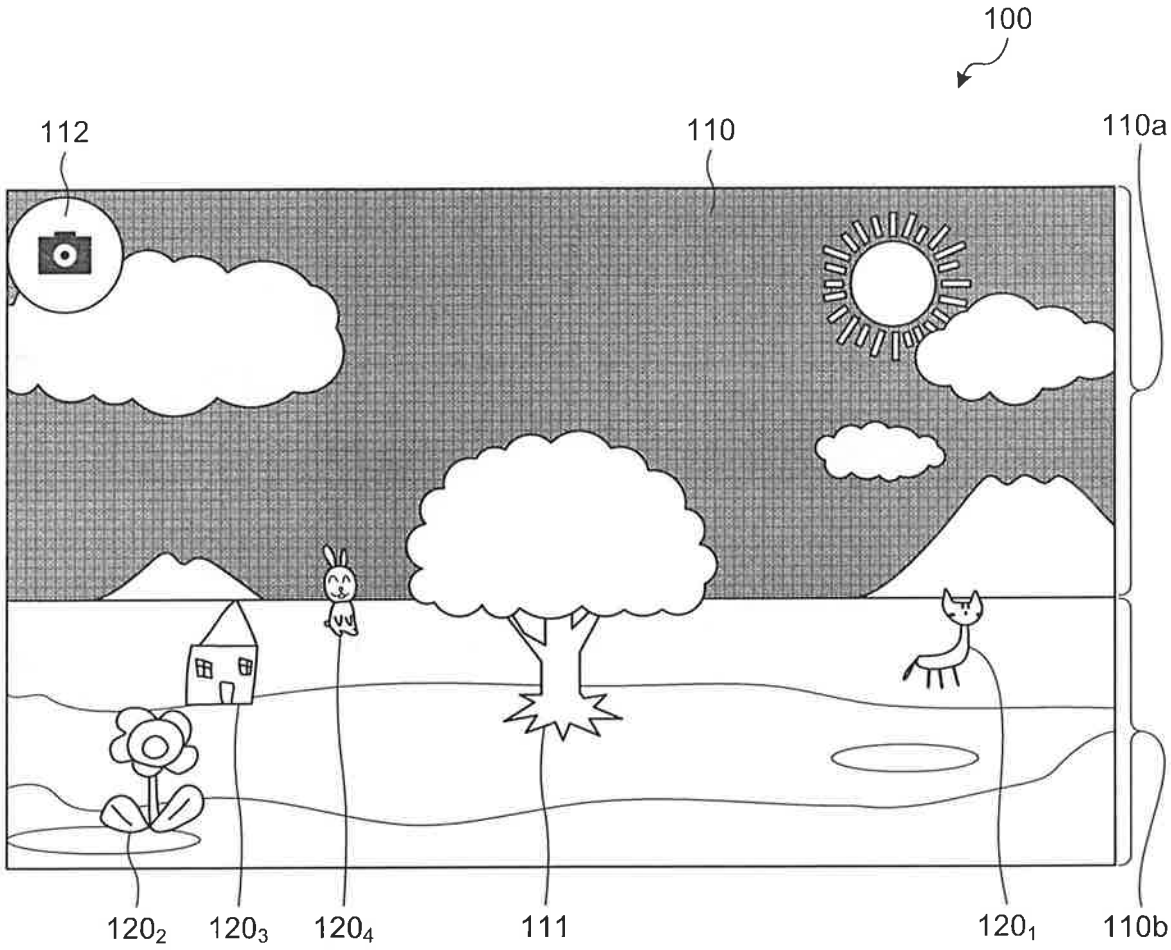


FIG.6

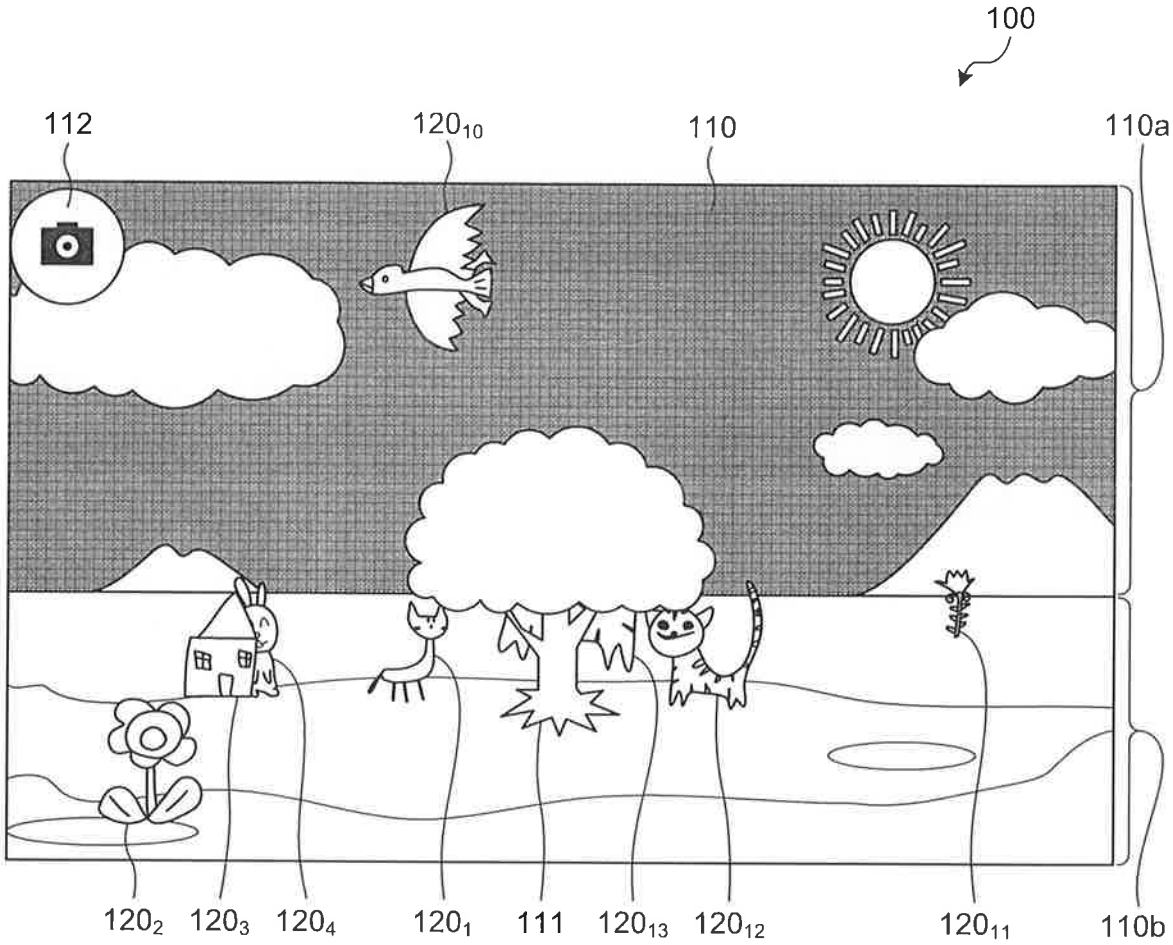

100
112
120_{10}
110
110a
120_2
120_3
120_4
120_1
111
120_{13}
120_{12}
120_{11}
110b

FIG.7

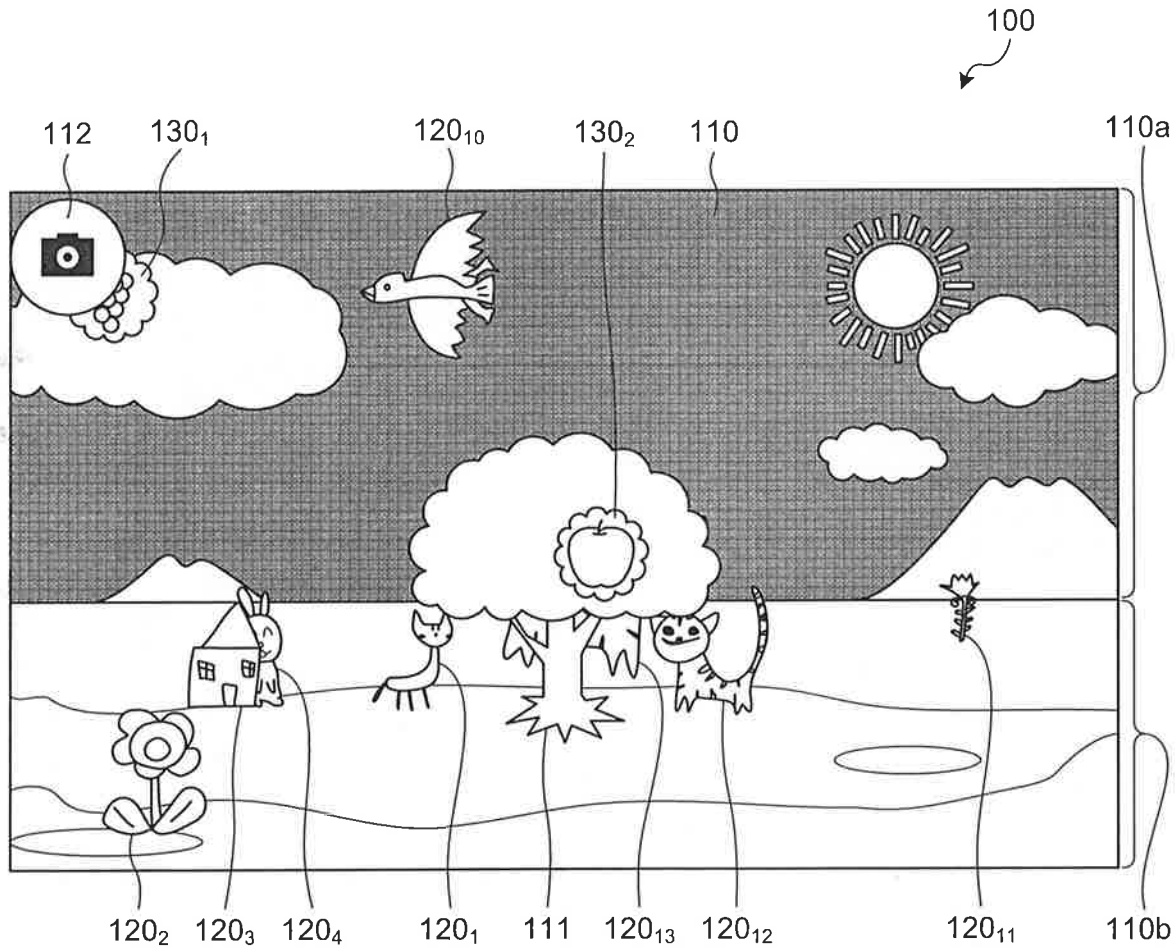

100
112
130_1
120_{10}
130_2
110
110a
120_2
120_3
120_4
120_1
111
120_{13}
120_{12}
120_{11}
110b

FIG.8

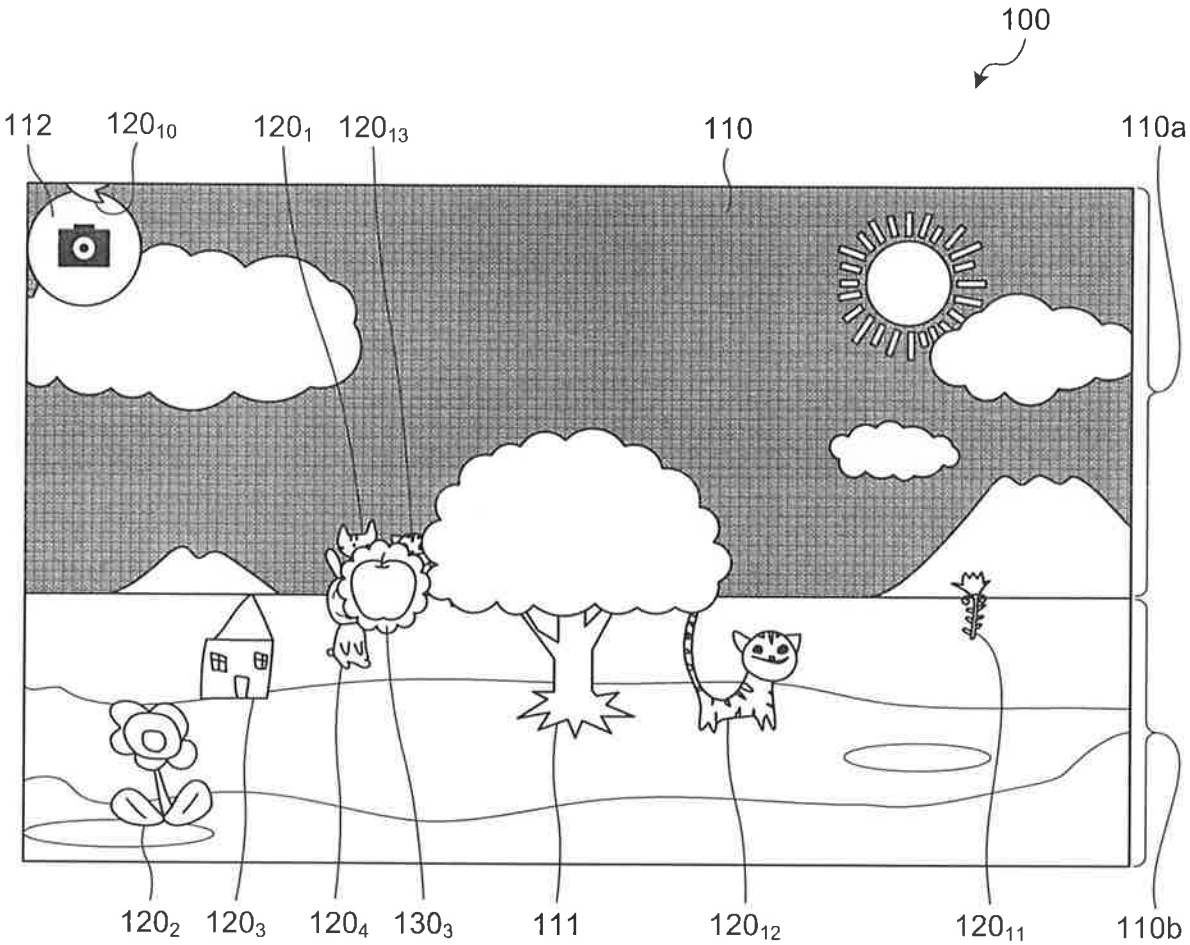

100
112
120_{10}
120_1
120_{13}
110
110a
120_2
120_3
120_4
130_3
111
120_{12}
120_{11}
110b

FIG.9

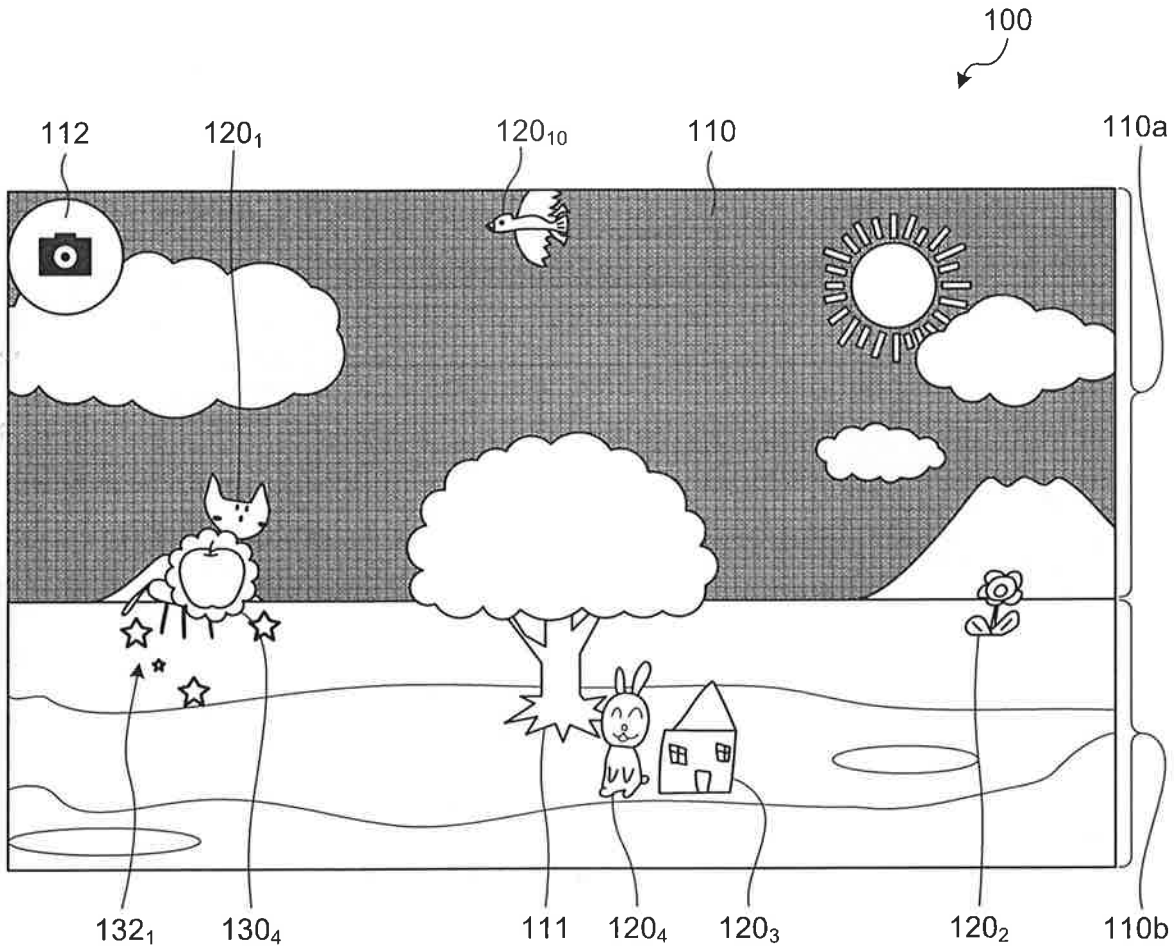


FIG.10

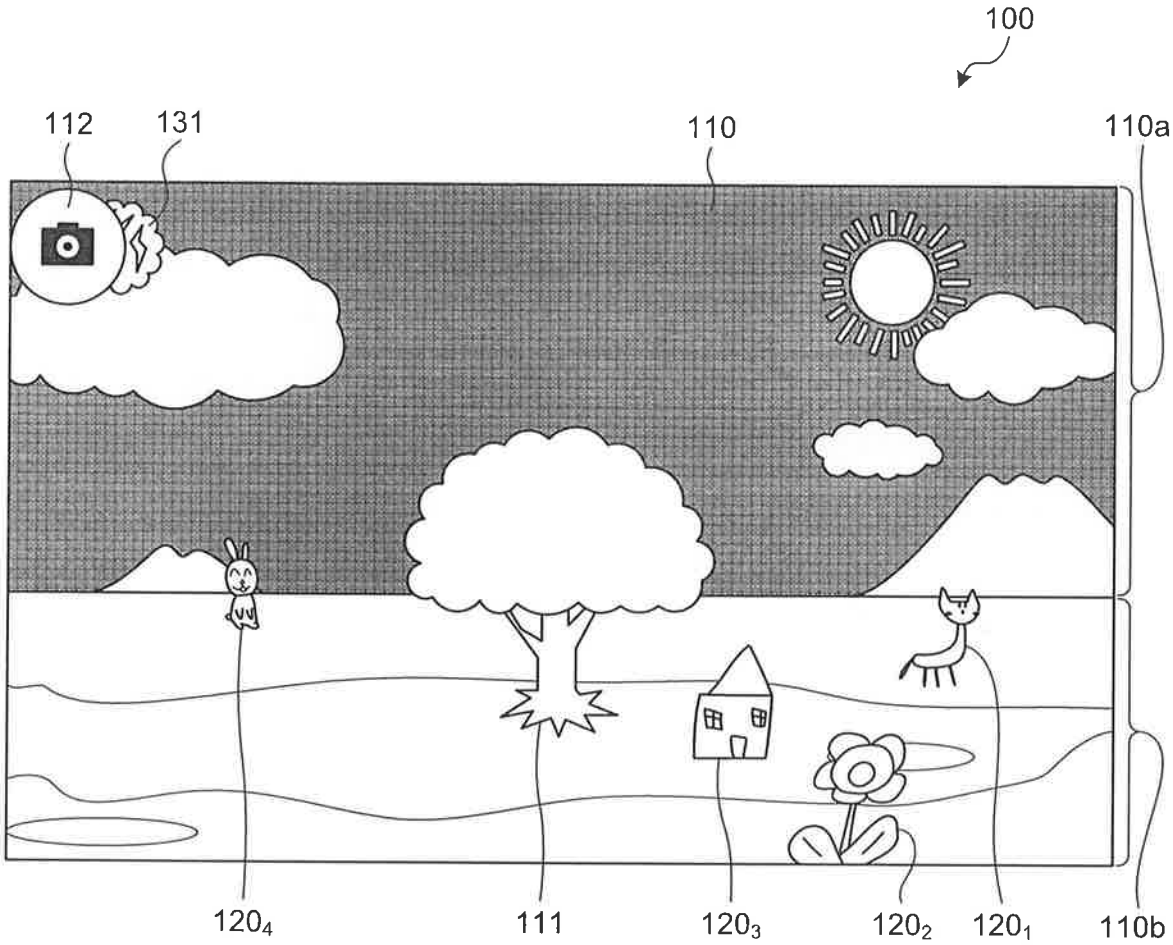


FIG.11A

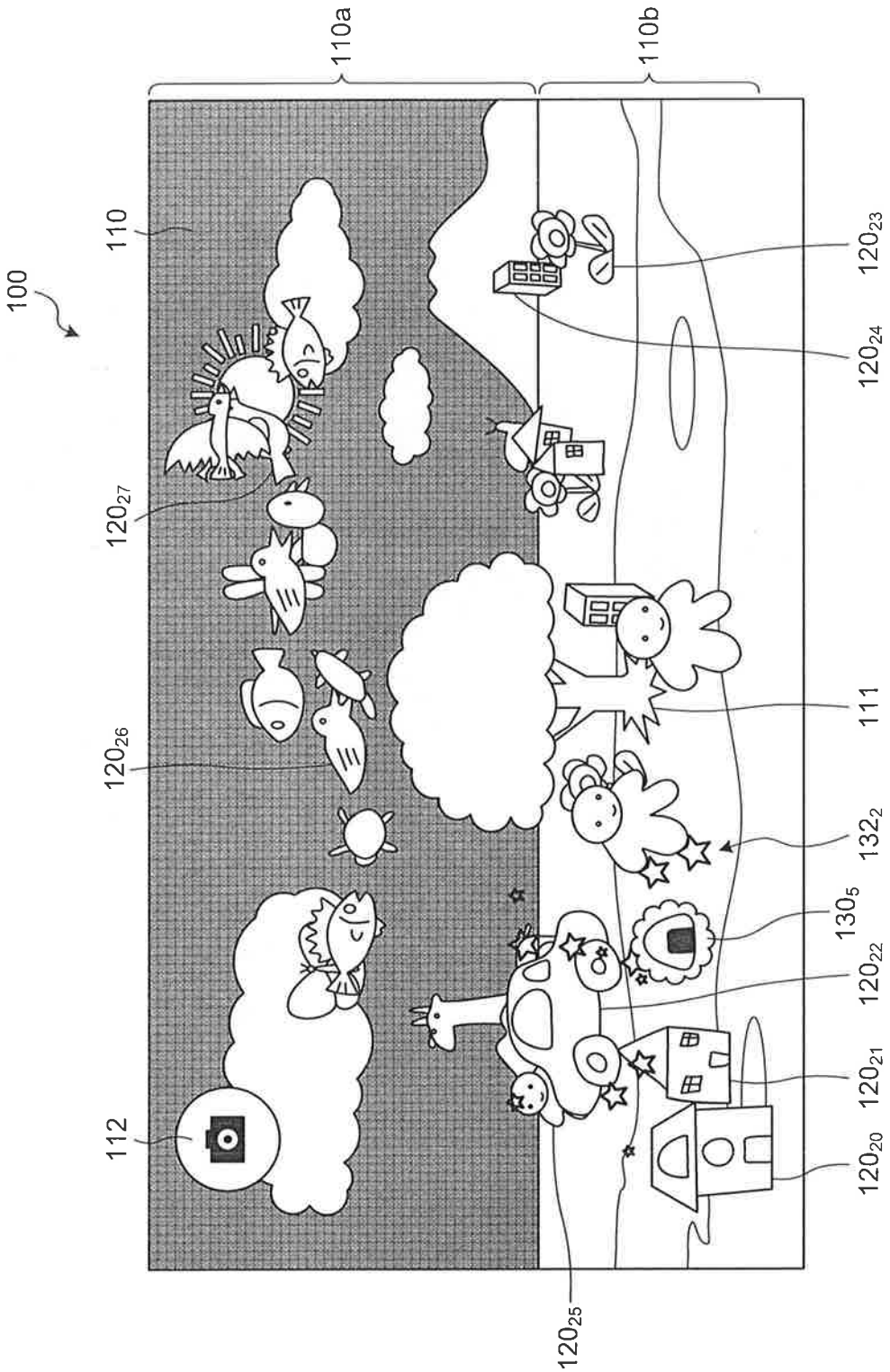

100
110
110a
110b
120$_{23}$
120$_{24}$
120$_{27}$
120$_{26}$
111
132$_2$
130$_5$
120$_{22}$
120$_{21}$
120$_{20}$
112
120$_{25}$

FIG.11B

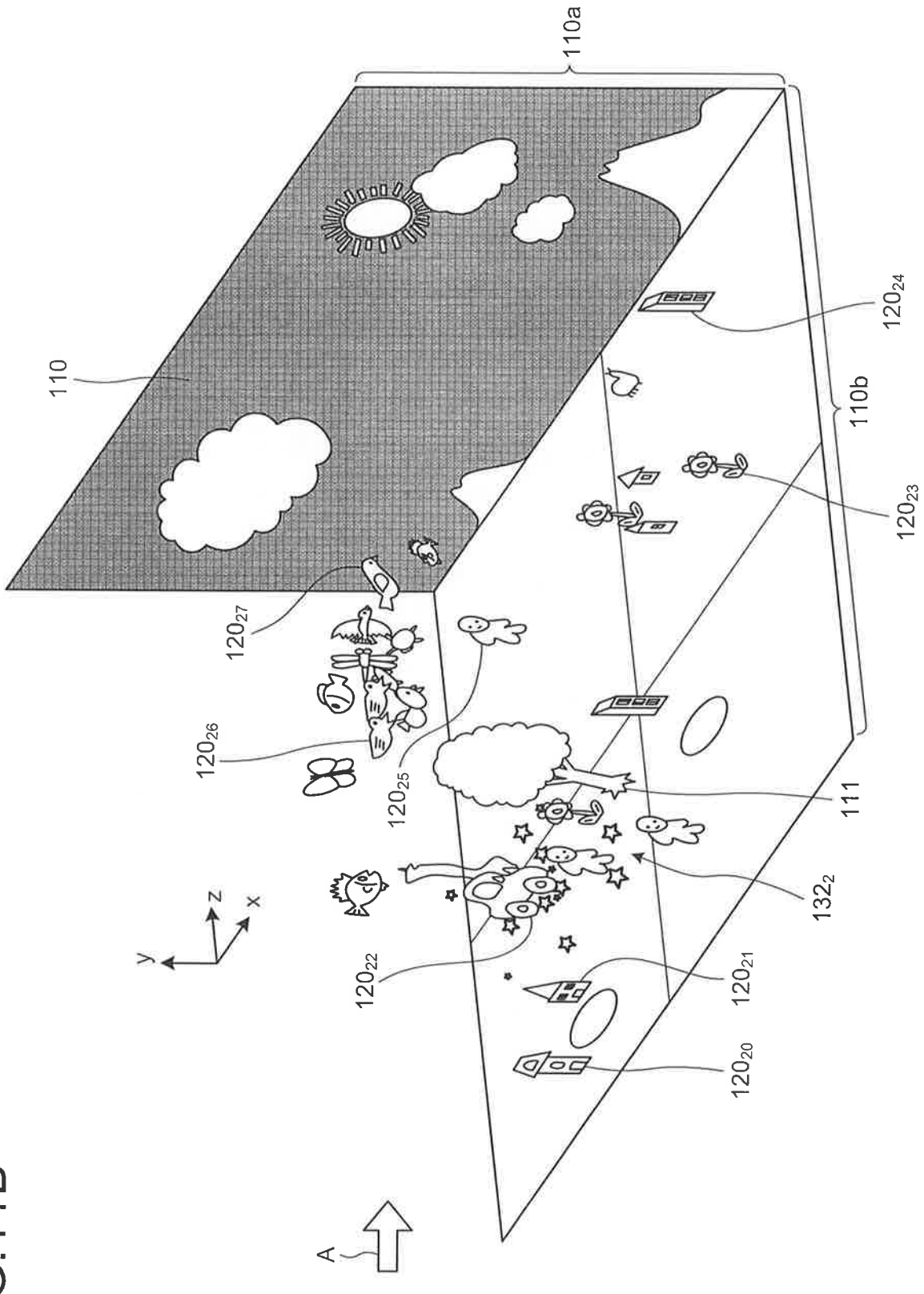

110a
110
110b
120_{24}
120_{23}
120_{27}
120_{26}
120_{25}
111
132_2
120_{22}
120_{21}
120_{20}
A
z
x
y

FIG.12

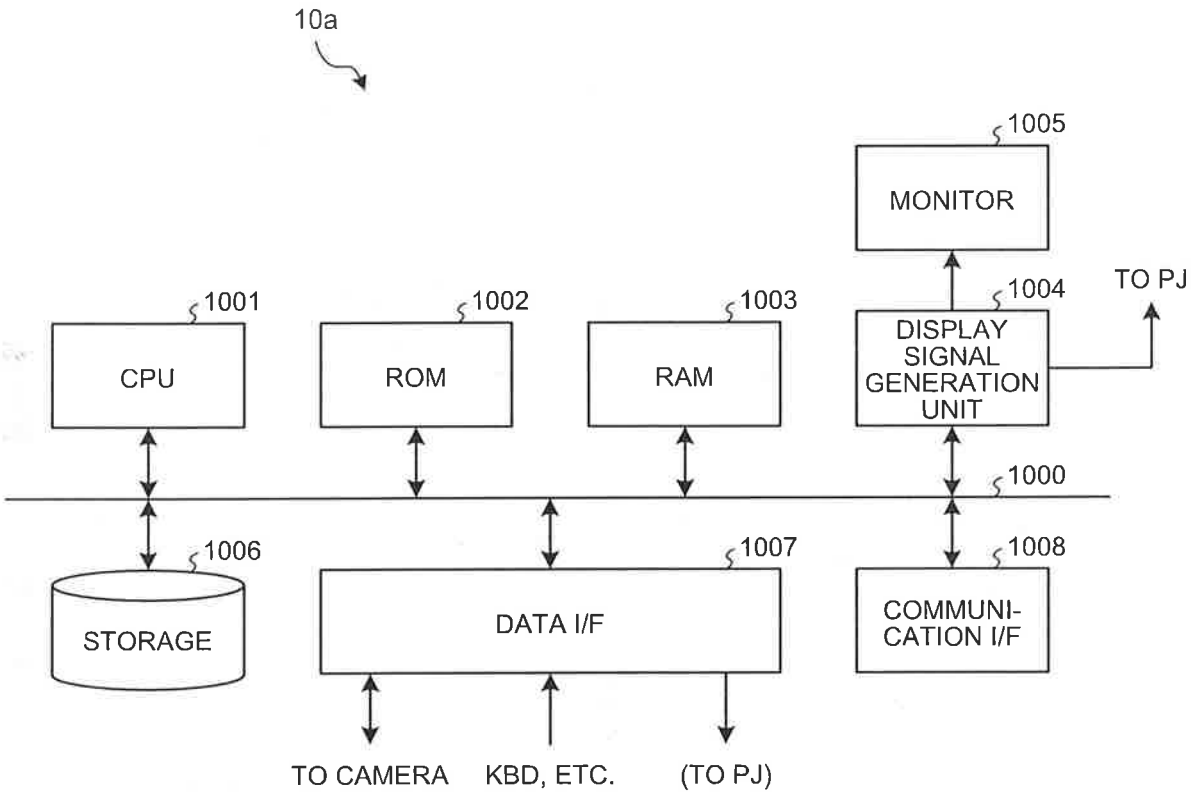

10a
1005
MONITOR
1001
CPU
1002
ROM
1003
RAM
1004
DISPLAY SIGNAL GENERATION UNIT
TO PJ
1000
1006
STORAGE
1007
DATA I/F
1008
COMMUNI-CATION I/F
TO CAMERA
KBD, ETC.
(TO PJ)

FIG.13

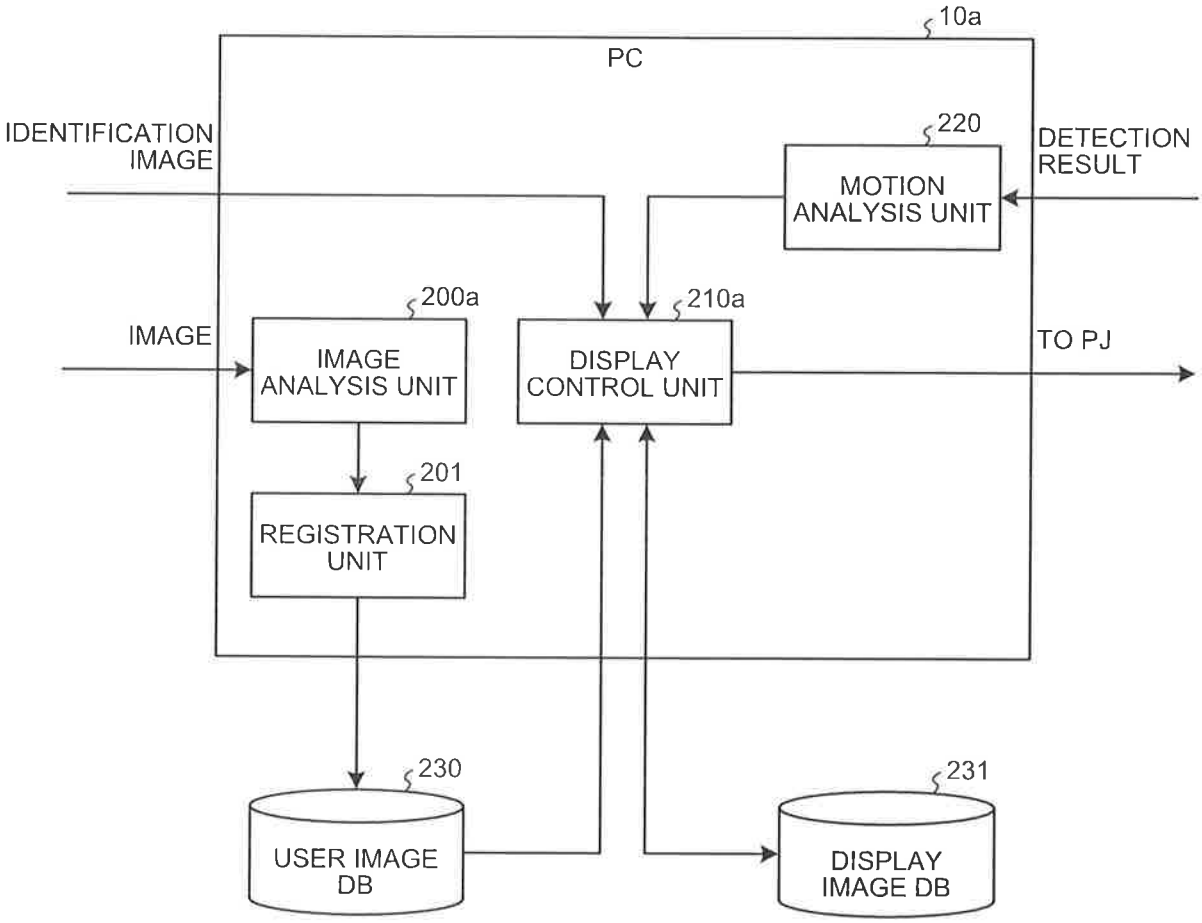

10a
PC
IDENTIFICATION IMAGE
220
MOTION ANALYSIS UNIT
DETECTION RESULT
IMAGE
200a
IMAGE ANALYSIS UNIT
210a
DISPLAY CONTROL UNIT
TO PJ
201
REGISTRATION UNIT
230
USER IMAGE DB
231
DISPLAY IMAGE DB

FIG.14

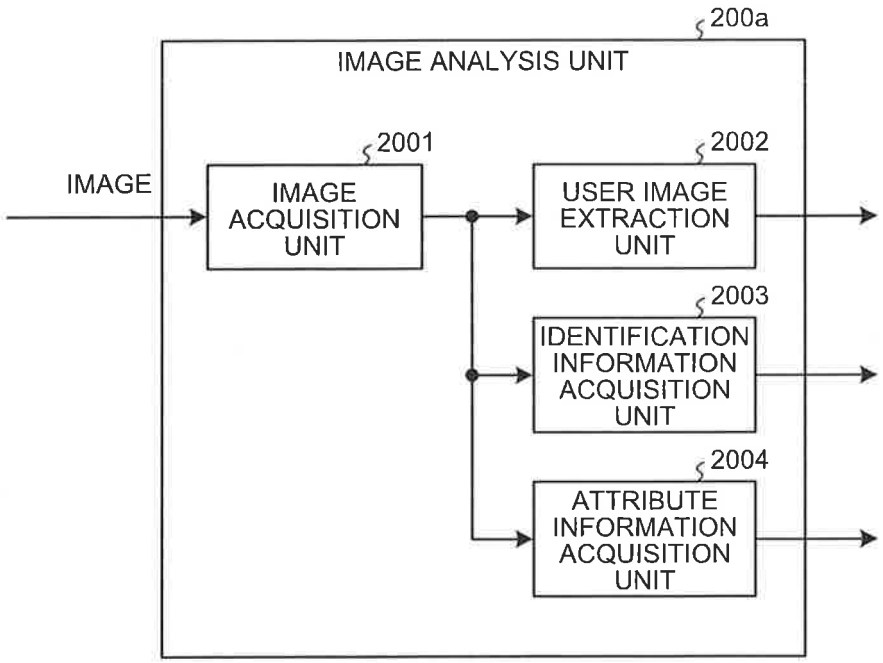

200a
IMAGE ANALYSIS UNIT
IMAGE
2001
IMAGE ACQUISITION UNIT
2002
USER IMAGE EXTRACTION UNIT
2003
IDENTIFICATION INFORMATION ACQUISITION UNIT
2004
ATTRIBUTE INFORMATION ACQUISITION UNIT

FIG.15

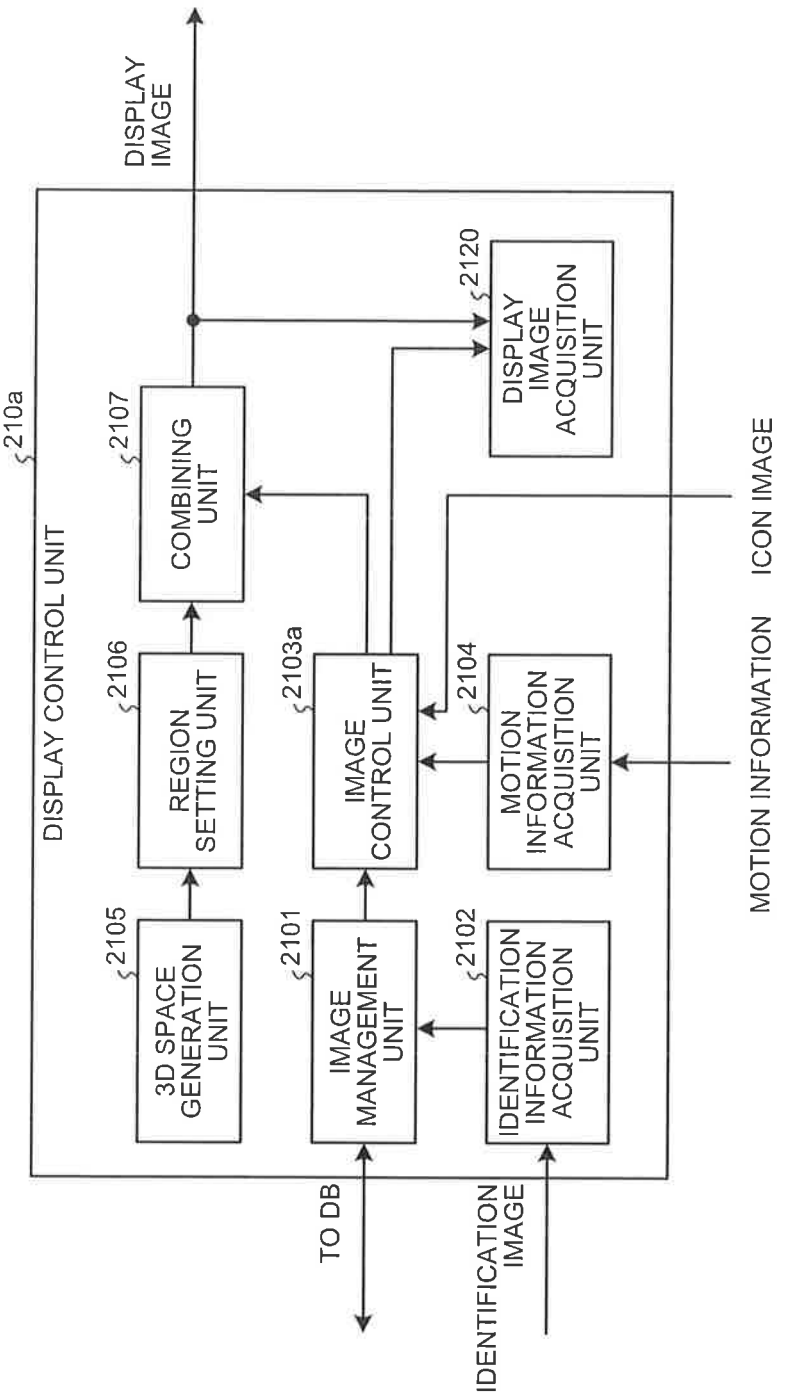

DISPLAY IMAGE
210a
DISPLAY CONTROL UNIT
2107
COMBINING UNIT
2120
DISPLAY IMAGE ACQUISITION UNIT
2106
REGION SETTING UNIT
2103a
IMAGE CONTROL UNIT
2104
MOTION INFORMATION ACQUISITION UNIT
ICON IMAGE
MOTION INFORMATION
2105
3D SPACE GENERATION UNIT
2101
IMAGE MANAGEMENT UNIT
2102
IDENTIFICATION INFORMATION ACQUISITION UNIT
TO DB
IDENTIFICATION IMAGE

FIG.16

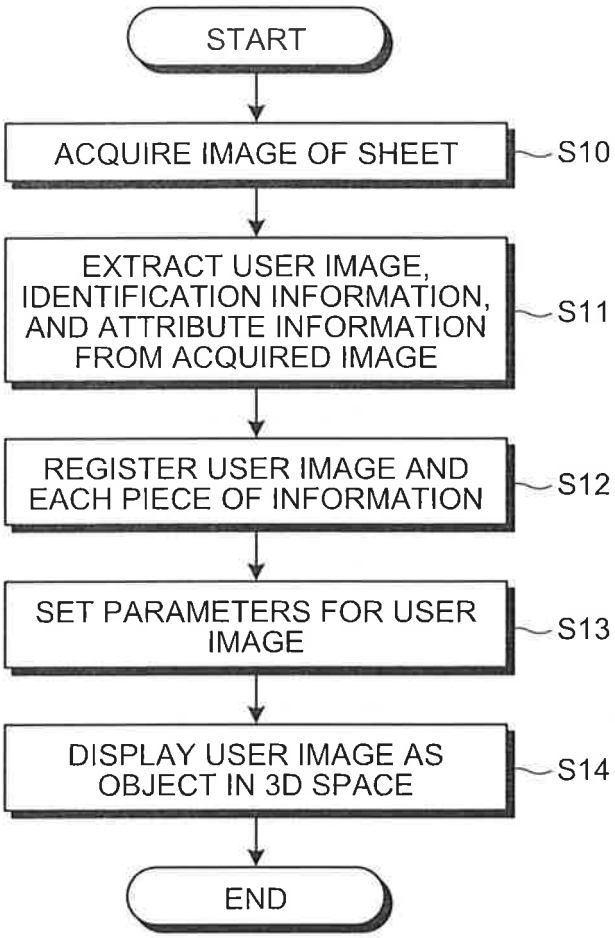

START
ACQUIRE IMAGE OF SHEET
S10
EXTRACT USER IMAGE, IDENTIFICATION INFORMATION, AND ATTRIBUTE INFORMATION FROM ACQUIRED IMAGE
S11
REGISTER USER IMAGE AND EACH PIECE OF INFORMATION
S12
SET PARAMETERS FOR USER IMAGE
S13
DISPLAY USER IMAGE AS OBJECT IN 3D SPACE
S14
END

FIG.17

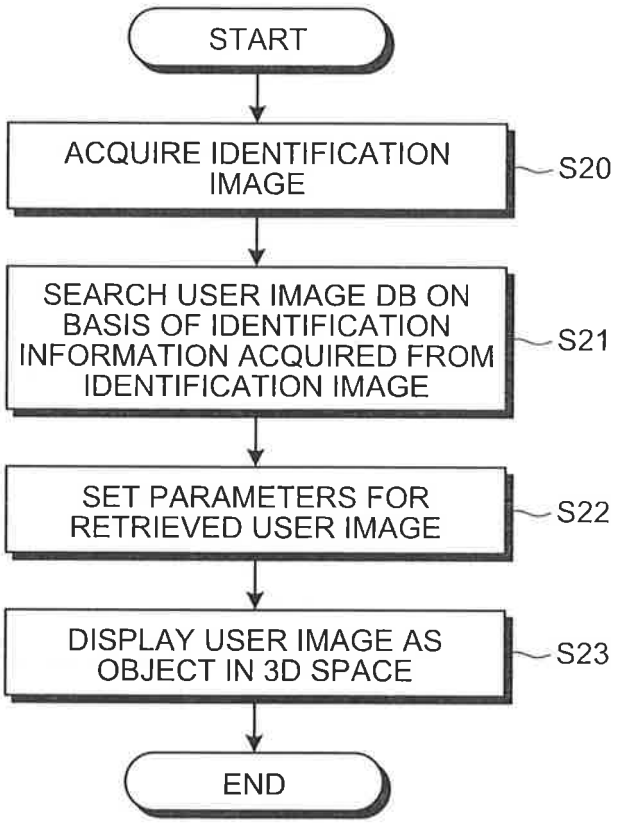

START
ACQUIRE IDENTIFICATION IMAGE
S20
SEARCH USER IMAGE DB ON BASIS OF IDENTIFICATION INFORMATION ACQUIRED FROM IDENTIFICATION IMAGE
S21
SET PARAMETERS FOR RETRIEVED USER IMAGE
S22
DISPLAY USER IMAGE AS OBJECT IN 3D SPACE
S23
END

FIG.18

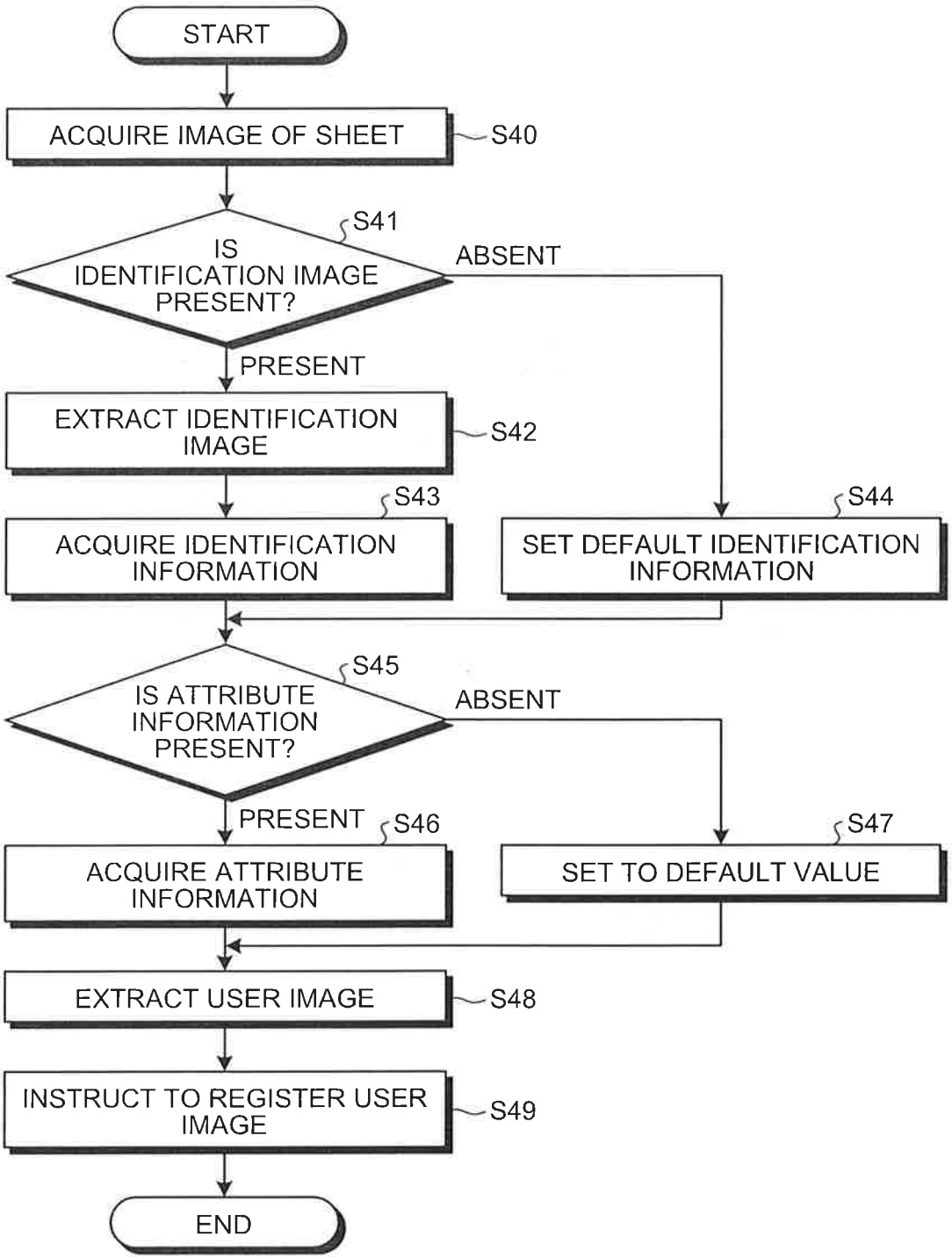

START
ACQUIRE IMAGE OF SHEET
S40
S41
IS IDENTIFICATION IMAGE PRESENT?
ABSENT
PRESENT
EXTRACT IDENTIFICATION IMAGE
S42
S43
ACQUIRE IDENTIFICATION INFORMATION
S44
SET DEFAULT IDENTIFICATION INFORMATION
S45
IS ATTRIBUTE INFORMATION PRESENT?
ABSENT
PRESENT
S46
ACQUIRE ATTRIBUTE INFORMATION
S47
SET TO DEFAULT VALUE
EXTRACT USER IMAGE
S48
INSTRUCT TO REGISTER USER IMAGE
S49
END

FIG.19

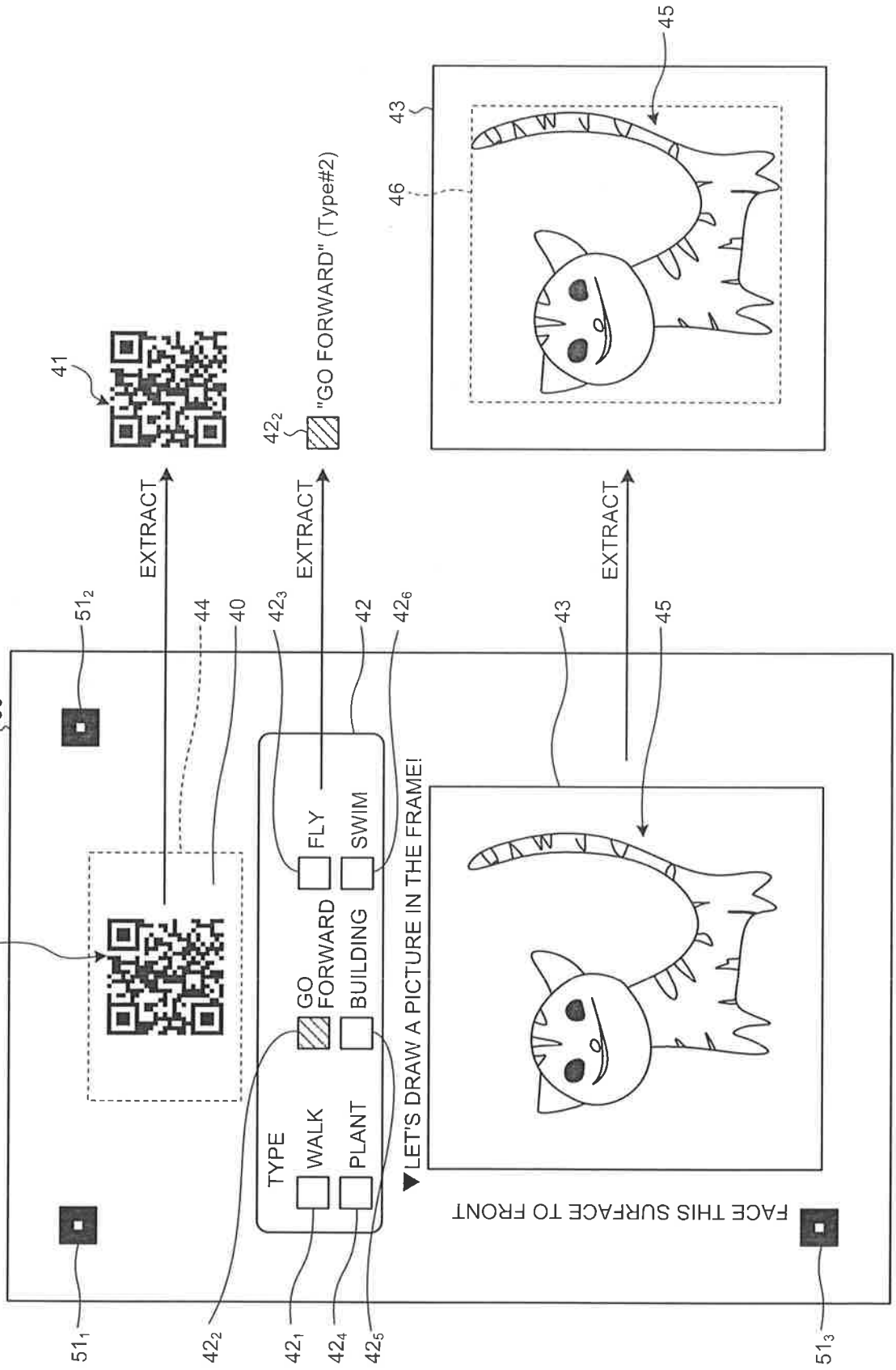

50
41
51_2
EXTRACT
44
40
42_3
42
42_6
43
45
TYPE
WALK
PLANT
GO FORWARD
BUILDING
FLY
SWIM
▼LET'S DRAW A PICTURE IN THE FRAME!
FACE THIS SURFACE TO FRONT
51_1
42_2
42_1
42_4
42_5
51_3
"GO FORWARD" (Type#2)
46

FIG.20

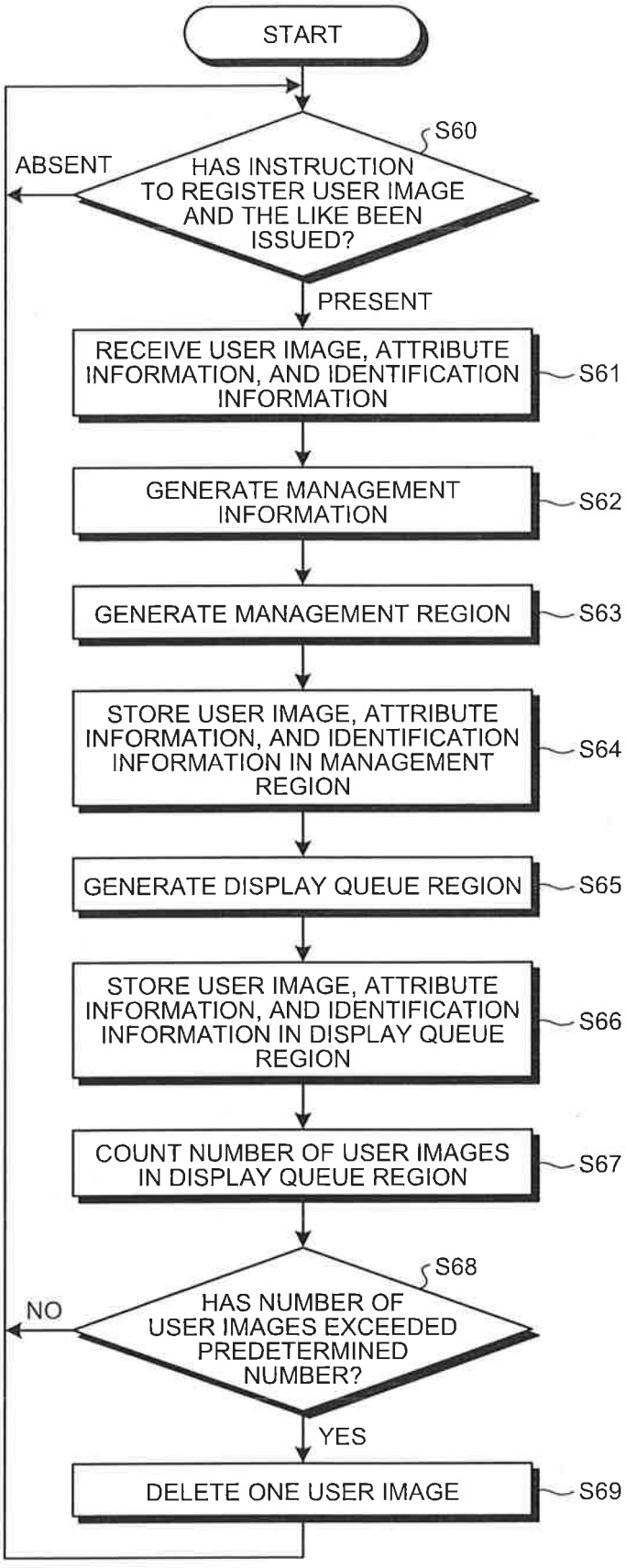

START
S60
HAS INSTRUCTION TO REGISTER USER IMAGE AND THE LIKE BEEN ISSUED?
ABSENT
PRESENT
RECEIVE USER IMAGE, ATTRIBUTE INFORMATION, AND IDENTIFICATION INFORMATION
S61
GENERATE MANAGEMENT INFORMATION
S62
GENERATE MANAGEMENT REGION
S63
STORE USER IMAGE, ATTRIBUTE INFORMATION, AND IDENTIFICATION INFORMATION IN MANAGEMENT REGION
S64
GENERATE DISPLAY QUEUE REGION
S65
STORE USER IMAGE, ATTRIBUTE INFORMATION, AND IDENTIFICATION INFORMATION IN DISPLAY QUEUE REGION
S66
COUNT NUMBER OF USER IMAGES IN DISPLAY QUEUE REGION
S67
S68
HAS NUMBER OF USER IMAGES EXCEEDED PREDETERMINED NUMBER?
NO
YES
DELETE ONE USER IMAGE
S69

FIG.21

IDENTIFICATION INFORMATION	IMAGE DATA	ATTRIBUTE INFORMATION
A001	abc001	Type#1
	abc002	Type#1
	def001	Type#2
	xyz001	Type#3
B021	cde010	Type#4
	fgh020	Type#3
	ijk021	Type#4

FIG.22

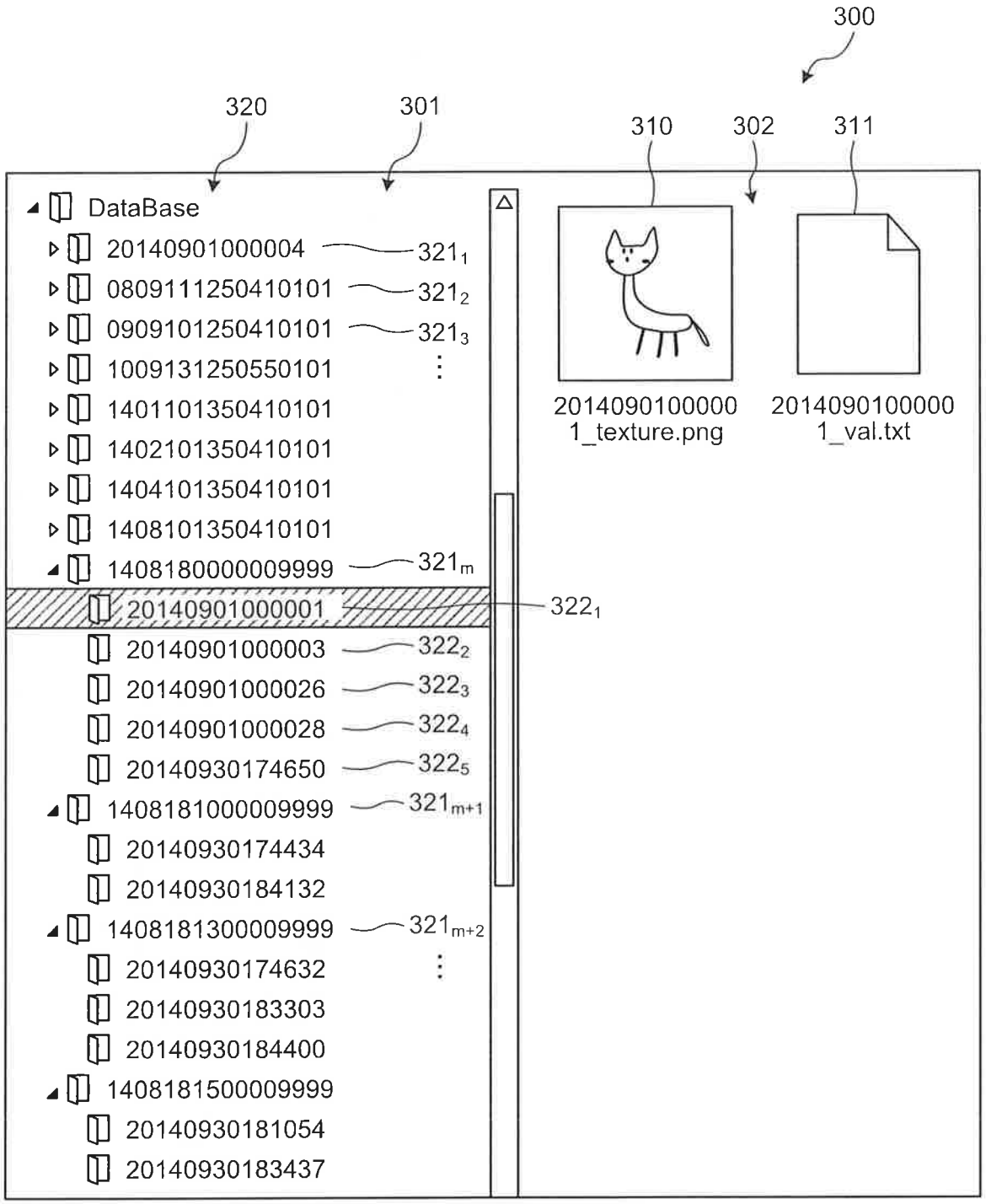

300
320
301
310
302
311
DataBase
20140901000004
3211
0809111250410101
3212
0909101250410101
3213
1009131250550101
1401101350410101
1402101350410101
1404101350410101
1408101350410101
1408180000009999
321m
20140901000001
3221
20140901000003
3222
20140901000026
3223
20140901000028
3224
20140930174650
3225
1408181000009999
321m+1
20140930174434
20140930184132
1408181300009999
321m+2
20140930174632
20140930183303
20140930184400
1408181500009999
20140930181054
20140930183437
20140901000001_texture.png
20140901000001_val.txt

FIG.23

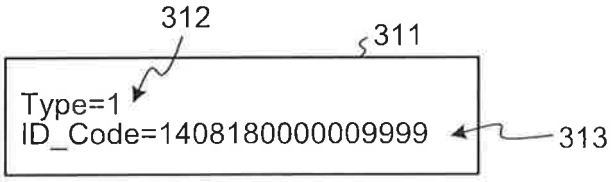

312
311
Type=1
ID_Code=1408180000009999
313

FIG.24

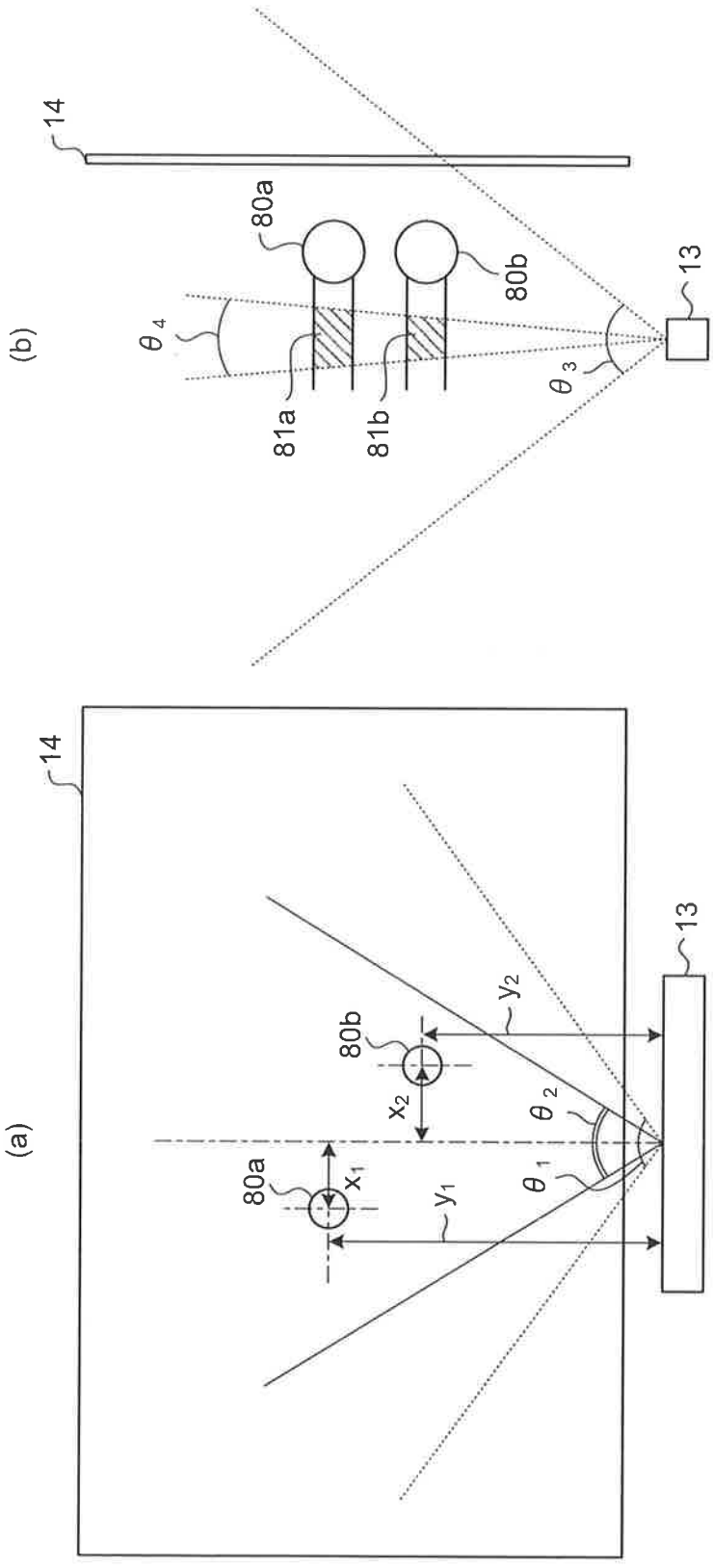

(a)
14
13
80a
80b
x_1
x_2
y_1
y_2
θ_1
θ_2
(b)
14
13
80a
80b
81a
81b
θ_3
θ_4

FIG.25

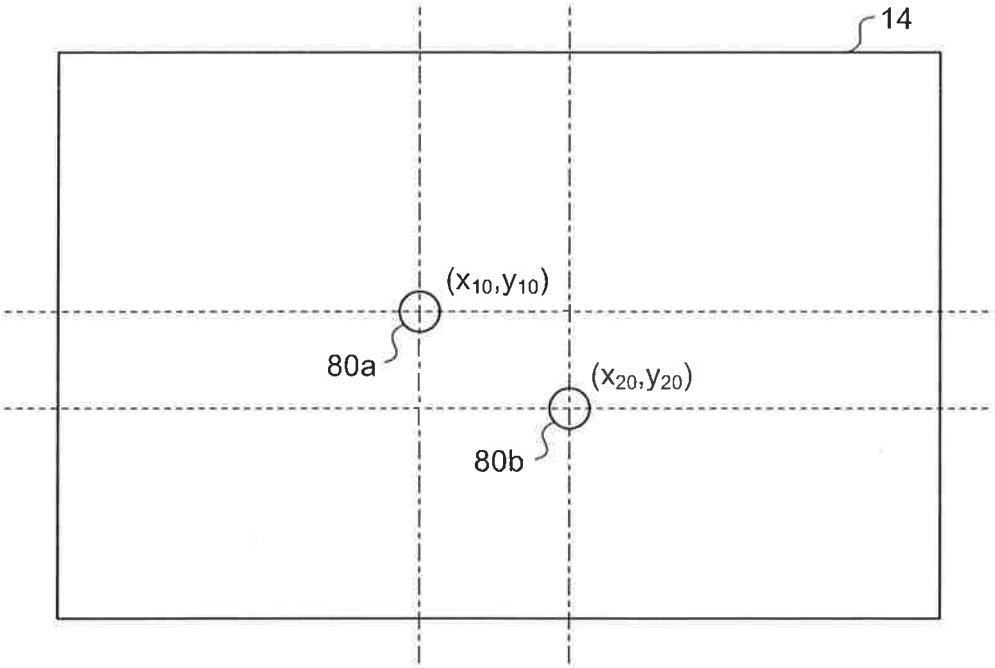

14
(x_{10},y_{10})
80a
(x_{20},y_{20})
80b

FIG.26

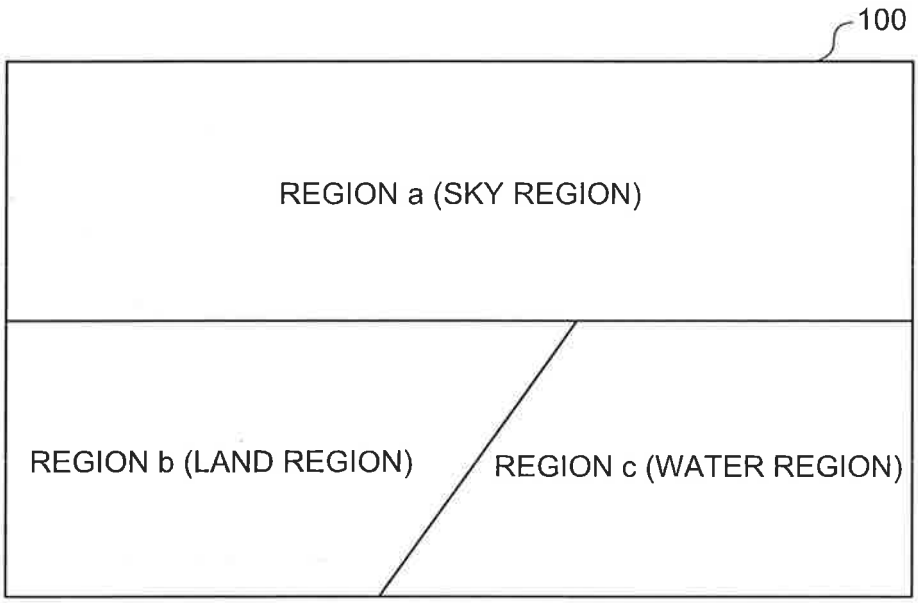

100
REGION a (SKY REGION)
REGION b (LAND REGION)
REGION c (WATER REGION)

FIG.27

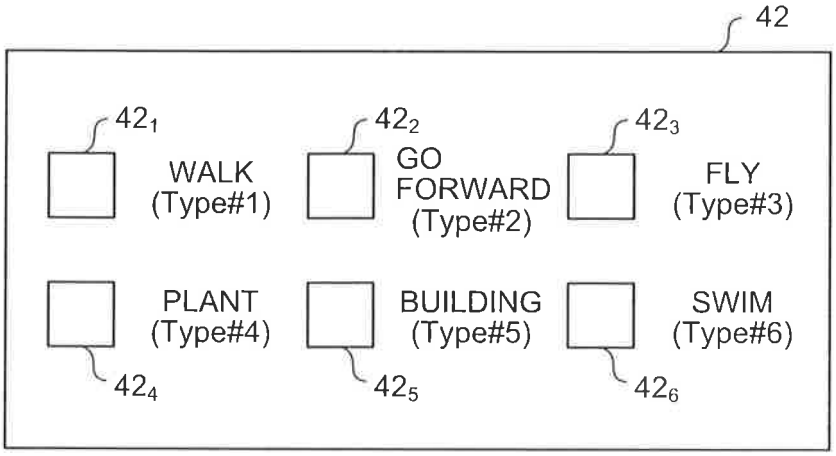


FIG.28

ATTRIBUTE		ARRANGEMENT REGION	MOVEMENT SPEED
Type#1	WALK	REGION b	LOW
Type#2	GO FORWARD	REGION b	HIGH
Type#3	FLY	REGION a	MIDDLE
Type#4	PLANT	REGION b	NOT MOVE
Type#5	BUILDING	REGION b	NOT MOVE
Type#6	SWIM	REGION c	MIDDLE

FIG.29

ICON IMAGE		CORRESPONDING ATTRIBUTE	EFFECT
Icon#1	APPLE	Type#1,Type#2	SPEED-UP
Icon#2	GRAPE	Type#3	SPEED-UP
Icon#3	RICE BALL	(ALL)	SPEED-UP, ENLARGEMENT
Icon#4	WATERING POT	Type#4	ENLARGEMENT
Icon#5	PAINT	Type#5	ENLARGEMENT
Icon#6	FEED	Type#6	SPEED-UP

FIG.30

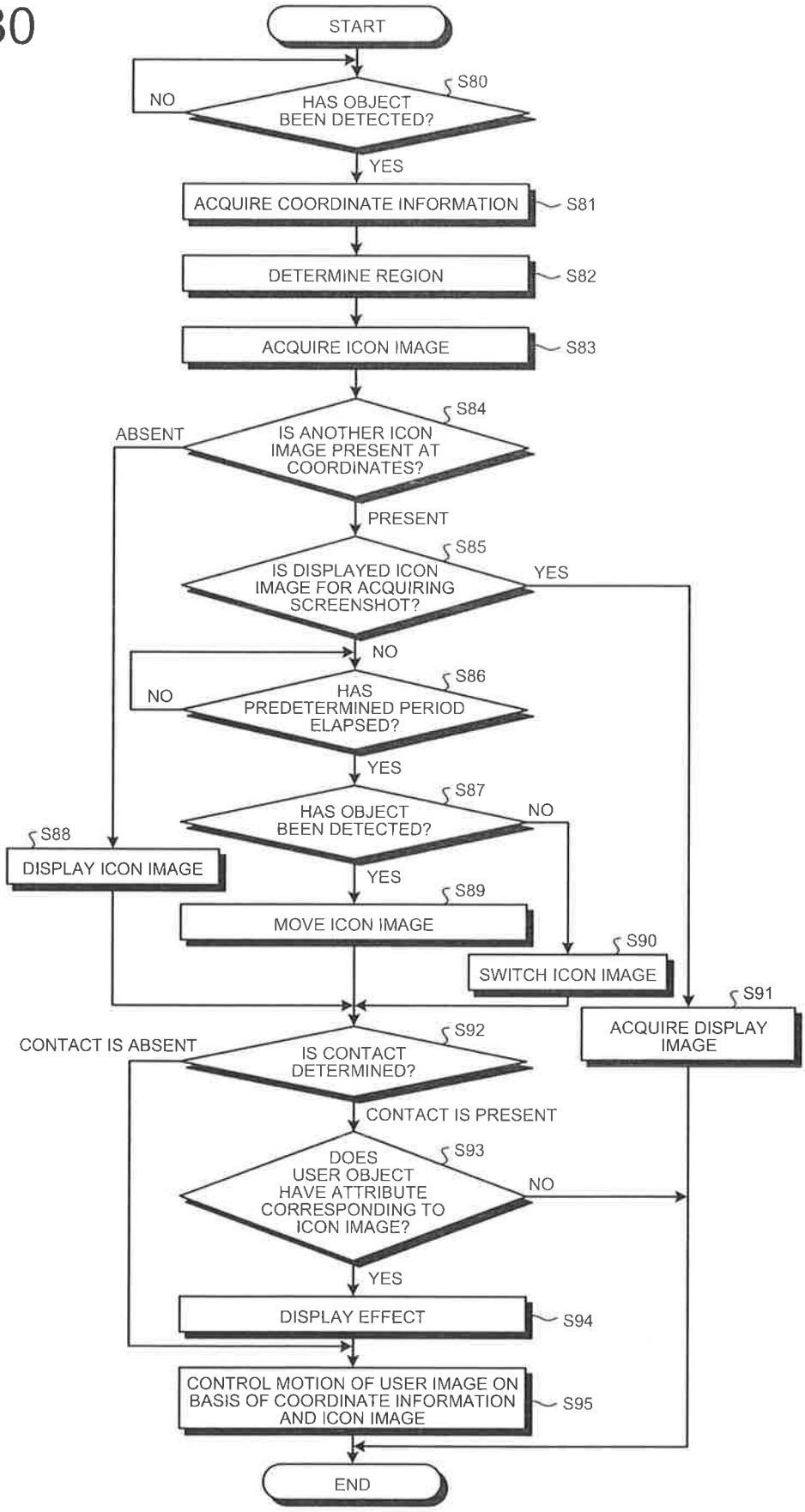

START
S80
HAS OBJECT BEEN DETECTED?
NO
YES
ACQUIRE COORDINATE INFORMATION
S81
DETERMINE REGION
S82
ACQUIRE ICON IMAGE
S83
S84
IS ANOTHER ICON IMAGE PRESENT AT COORDINATES?
ABSENT
PRESENT
S85
IS DISPLAYED ICON IMAGE FOR ACQUIRING SCREENSHOT?
YES
NO
S86
HAS PREDETERMINED PERIOD ELAPSED?
NO
YES
S87
HAS OBJECT BEEN DETECTED?
NO
S88
DISPLAY ICON IMAGE
YES
S89
MOVE ICON IMAGE
S90
SWITCH ICON IMAGE
S91
ACQUIRE DISPLAY IMAGE
S92
IS CONTACT DETERMINED?
CONTACT IS ABSENT
CONTACT IS PRESENT
S93
DOES USER OBJECT HAVE ATTRIBUTE CORRESPONDING TO ICON IMAGE?
NO
YES
DISPLAY EFFECT
S94
CONTROL MOTION OF USER IMAGE ON BASIS OF COORDINATE INFORMATION AND ICON IMAGE
S95
END

FIG.31

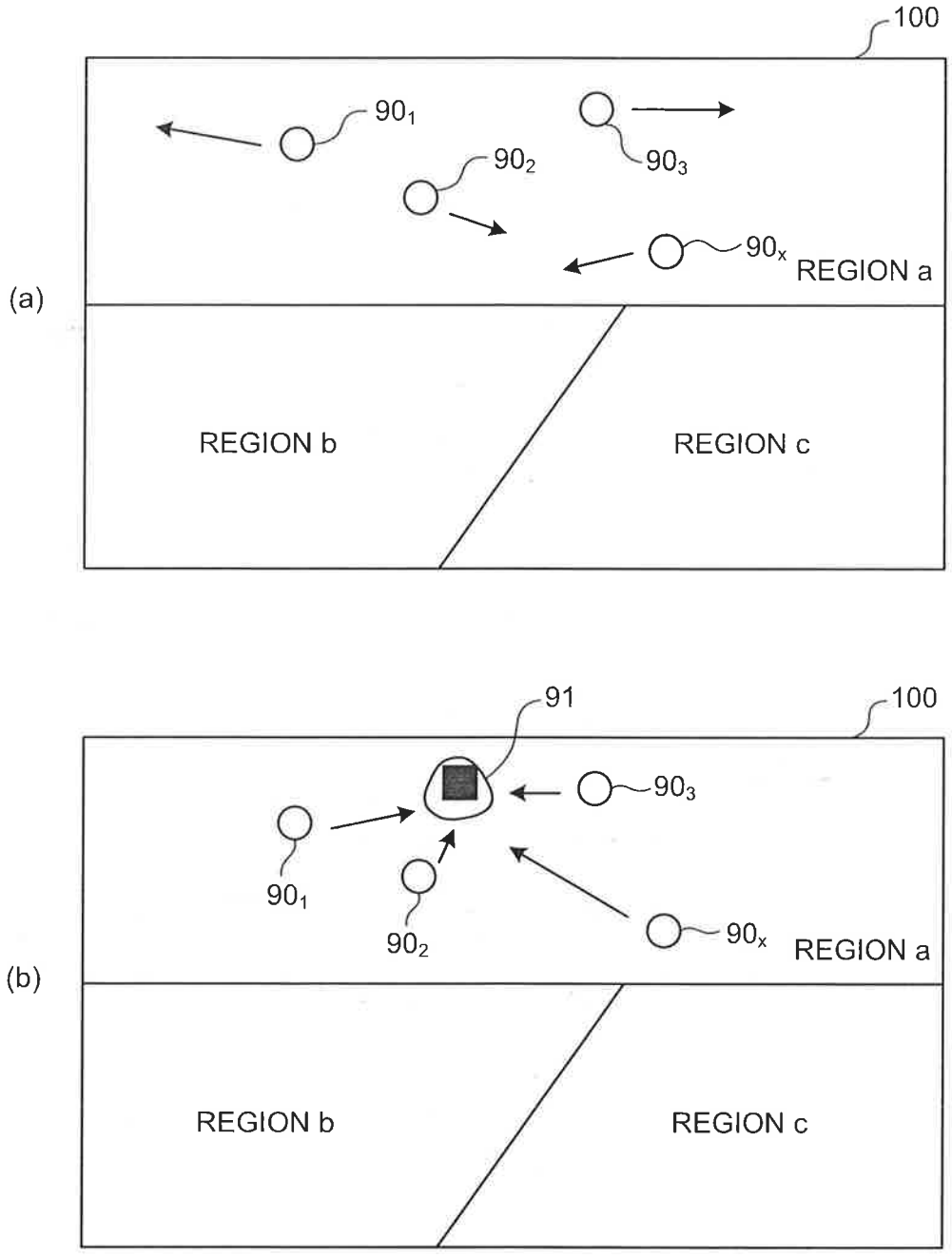

(a)
100
90_1
90_2
90_3
90_x
REGION a
REGION b
REGION c
(b)
91
100
90_3
90_1
90_2
90_x
REGION a
REGION b
REGION c

FIG.32

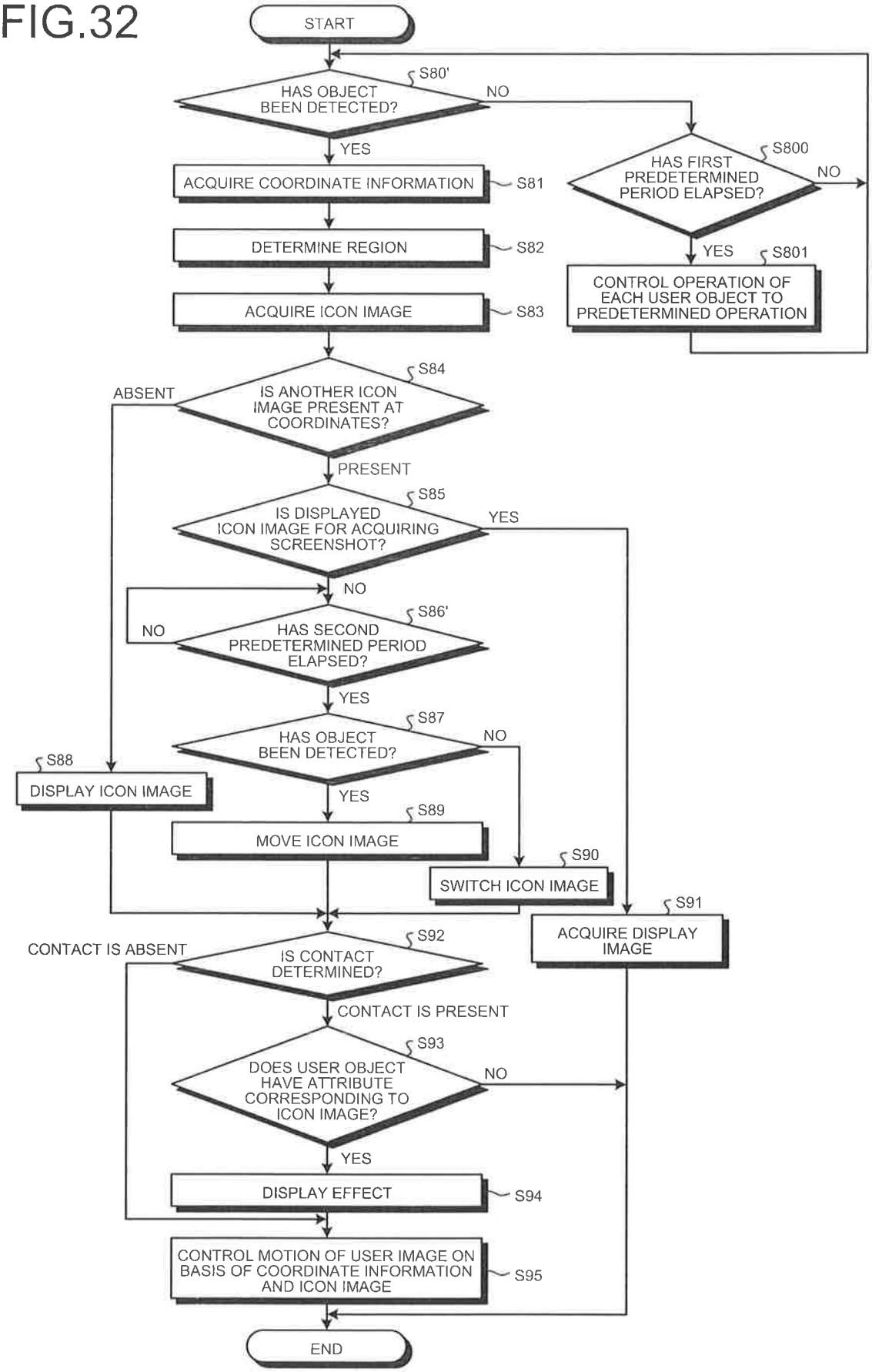

START
S80'
HAS OBJECT BEEN DETECTED?
NO
YES
S800
HAS FIRST PREDETERMINED PERIOD ELAPSED?
NO
YES
S801
CONTROL OPERATION OF EACH USER OBJECT TO PREDETERMINED OPERATION
ACQUIRE COORDINATE INFORMATION
S81
DETERMINE REGION
S82
ACQUIRE ICON IMAGE
S83
S84
IS ANOTHER ICON IMAGE PRESENT AT COORDINATES?
ABSENT
PRESENT
S85
IS DISPLAYED ICON IMAGE FOR ACQUIRING SCREENSHOT?
YES
NO
S86'
HAS SECOND PREDETERMINED PERIOD ELAPSED?
NO
YES
S87
HAS OBJECT BEEN DETECTED?
NO
YES
S88
DISPLAY ICON IMAGE
S89
MOVE ICON IMAGE
S90
SWITCH ICON IMAGE
S91
ACQUIRE DISPLAY IMAGE
S92
IS CONTACT DETERMINED?
CONTACT IS ABSENT
CONTACT IS PRESENT
S93
DOES USER OBJECT HAVE ATTRIBUTE CORRESPONDING TO ICON IMAGE?
NO
YES
DISPLAY EFFECT
S94
CONTROL MOTION OF USER IMAGE ON BASIS OF COORDINATE INFORMATION AND ICON IMAGE
S95
END

FIG.33

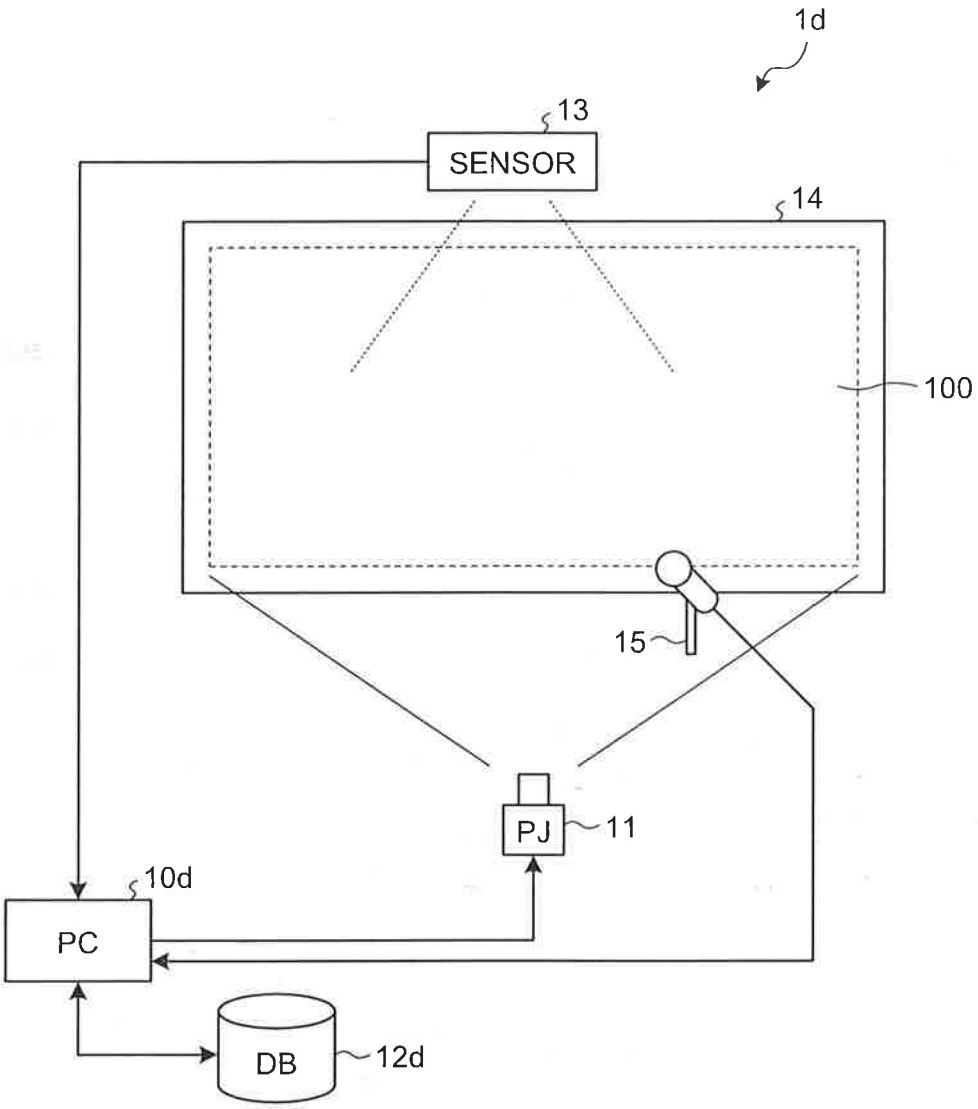


FIG.34

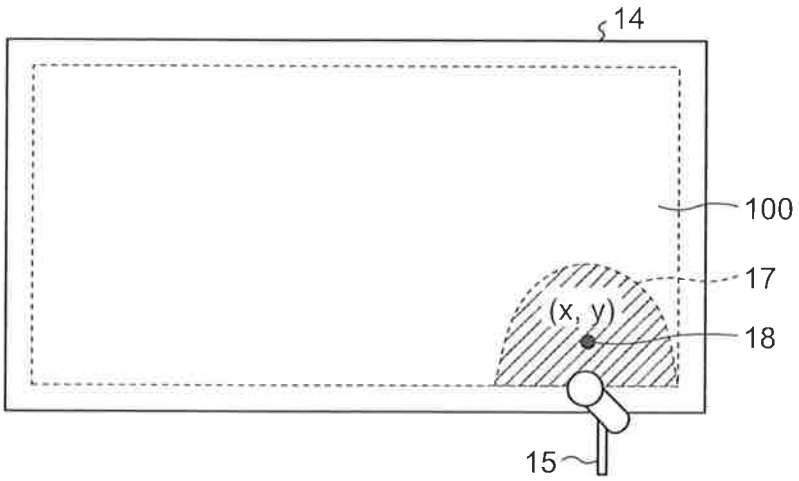


FIG.35

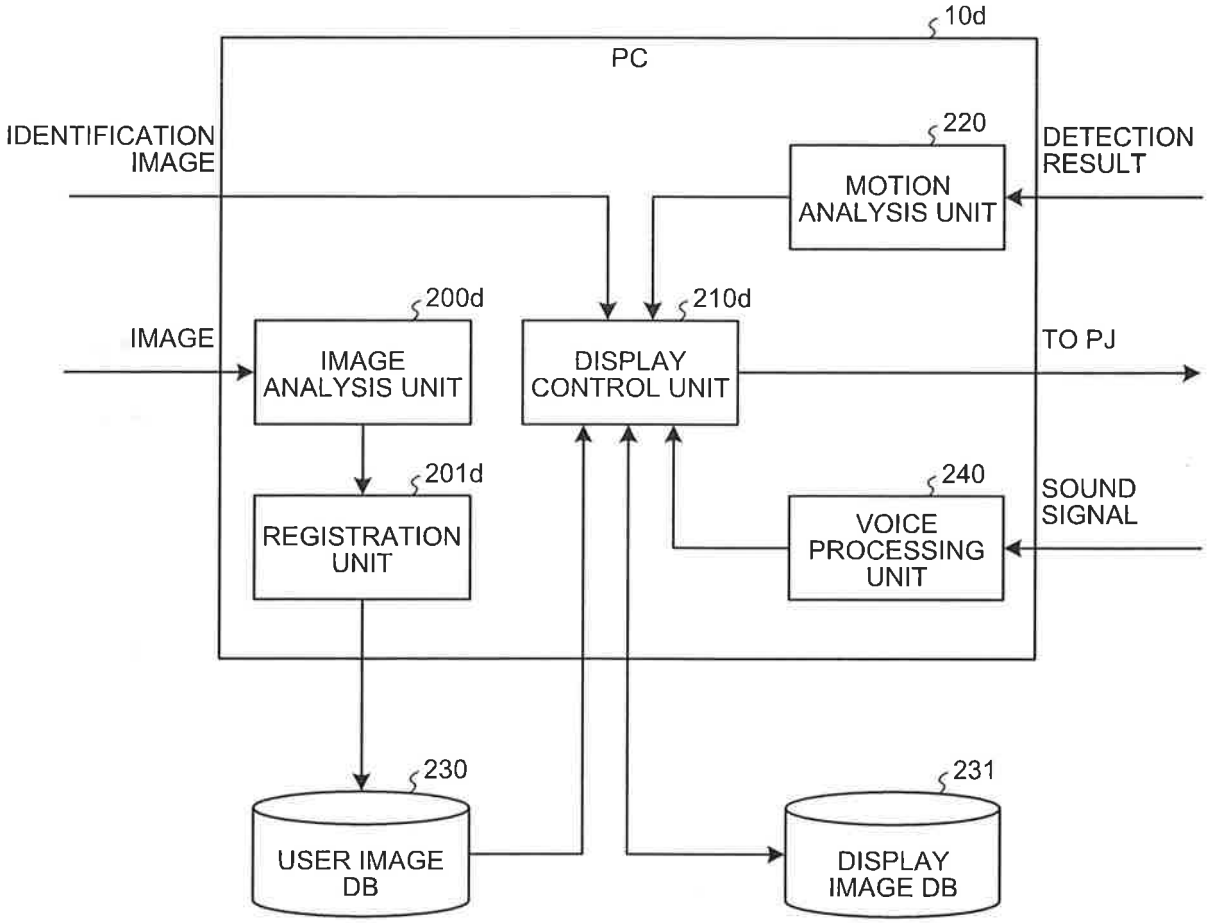

10d
PC
IDENTIFICATION IMAGE
220
MOTION ANALYSIS UNIT
DETECTION RESULT
IMAGE
200d
IMAGE ANALYSIS UNIT
210d
DISPLAY CONTROL UNIT
TO PJ
201d
REGISTRATION UNIT
240
VOICE PROCESSING UNIT
SOUND SIGNAL
230
USER IMAGE DB
231
DISPLAY IMAGE DB

FIG.36

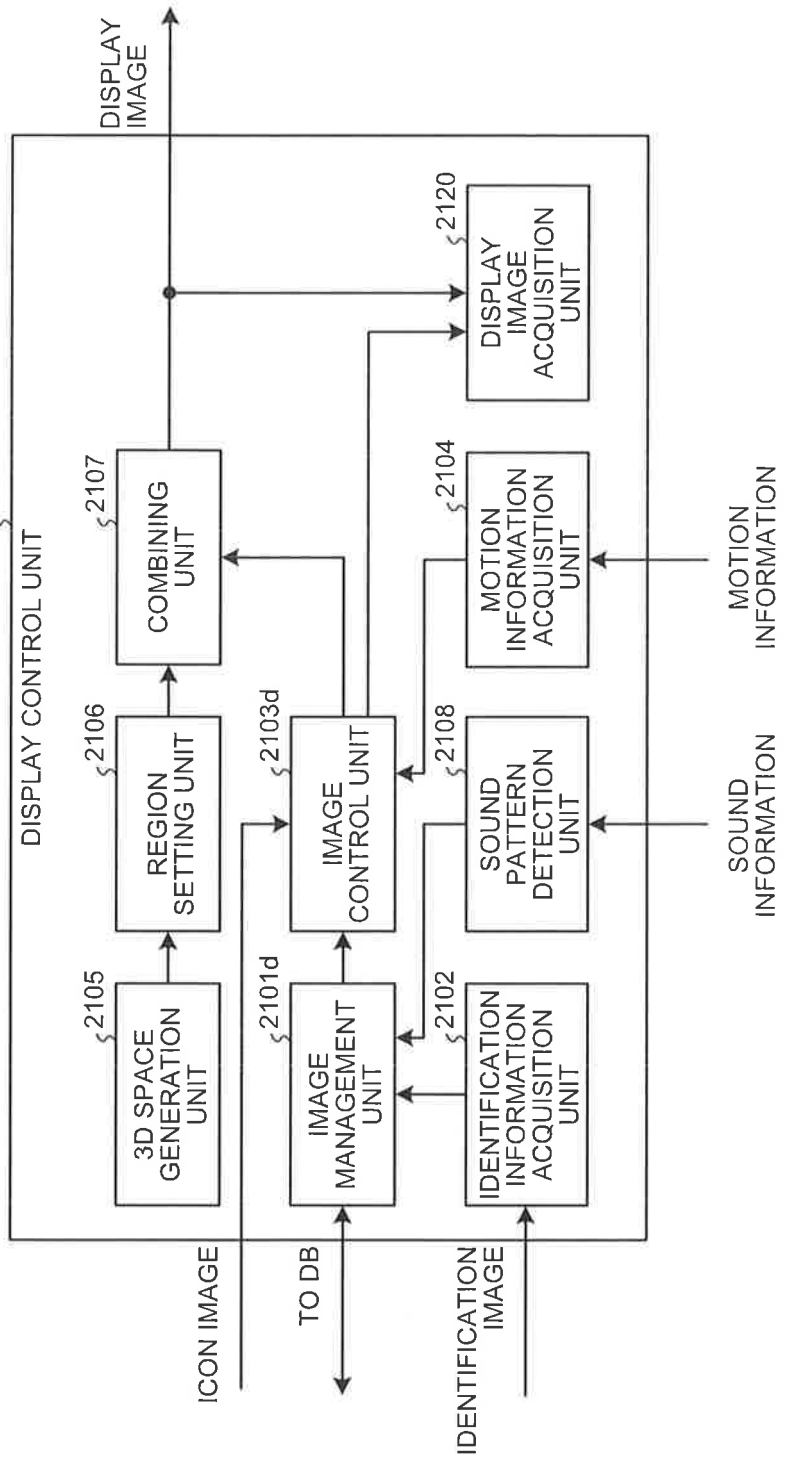

DISPLAY IMAGE
DISPLAY CONTROL UNIT
210d
2120
DISPLAY IMAGE ACQUISITION UNIT
2107
COMBINING UNIT
2104
MOTION INFORMATION ACQUISITION UNIT
MOTION INFORMATION
2106
REGION SETTING UNIT
2103d
IMAGE CONTROL UNIT
2108
SOUND PATTERN DETECTION UNIT
SOUND INFORMATION
2105
3D SPACE GENERATION UNIT
2101d
IMAGE MANAGEMENT UNIT
2102
IDENTIFICATION INFORMATION ACQUISITION UNIT
ICON IMAGE
TO DB
IDENTIFICATION IMAGE

FIG.37

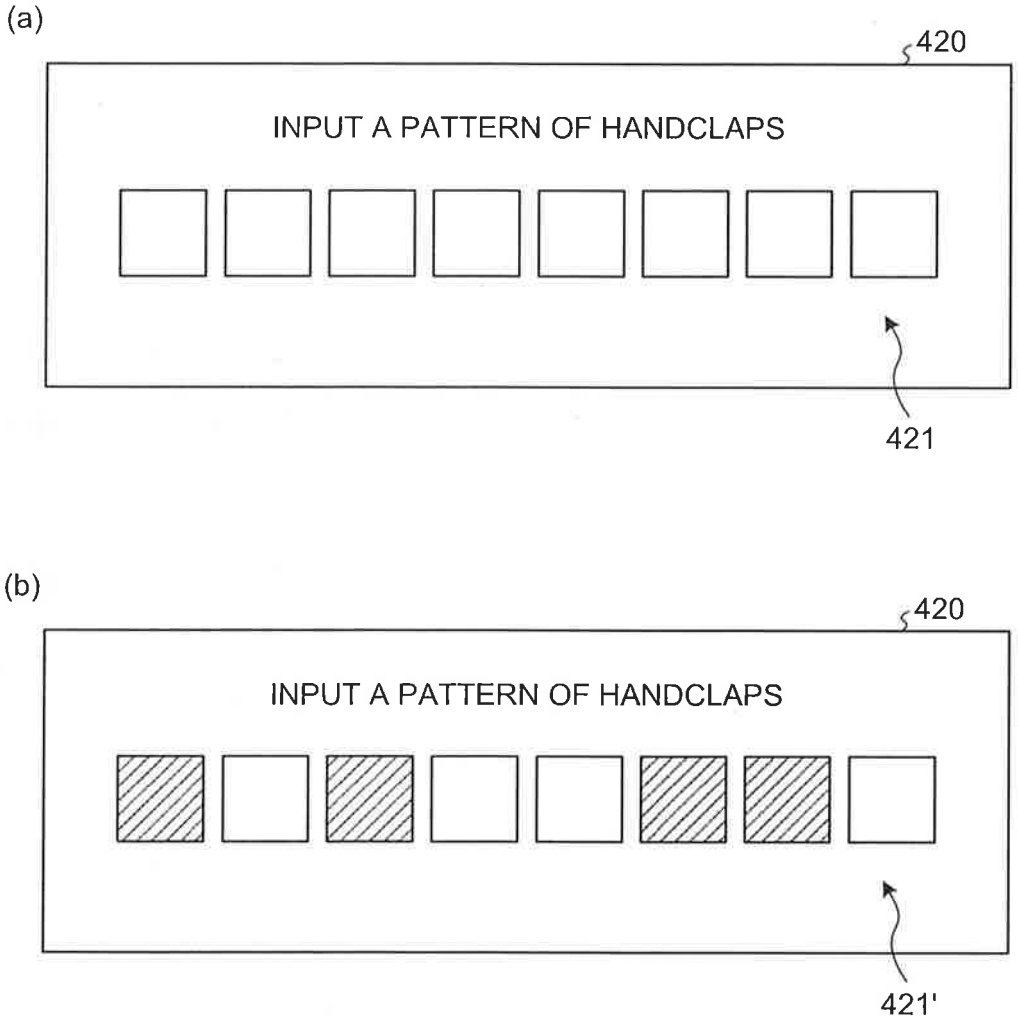

(a)
420
INPUT A PATTERN OF HANDCLAPS
421
(b)
420
INPUT A PATTERN OF HANDCLAPS
421'

FIG.38

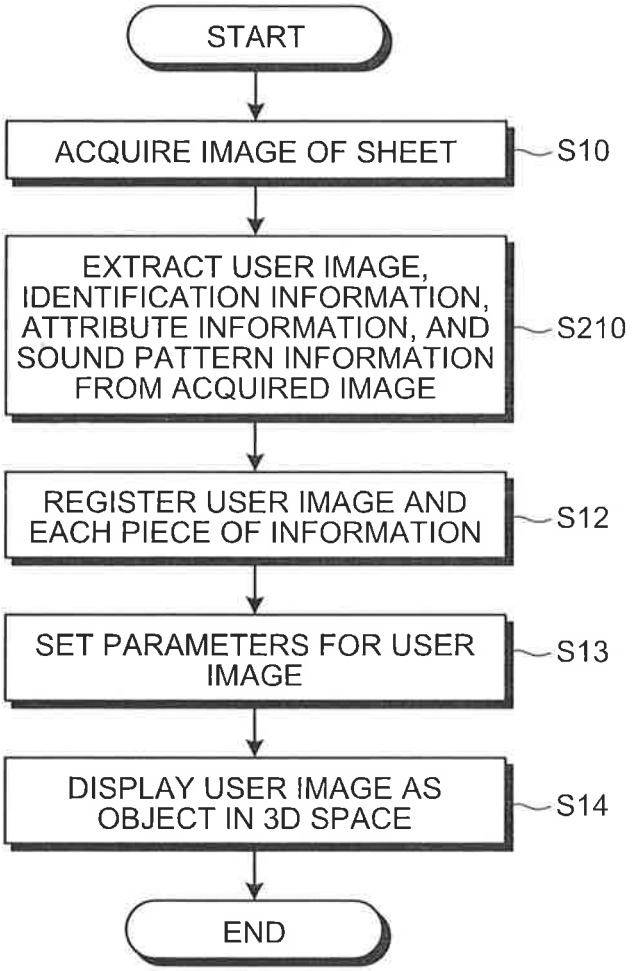

START
ACQUIRE IMAGE OF SHEET
S10
EXTRACT USER IMAGE, IDENTIFICATION INFORMATION, ATTRIBUTE INFORMATION, AND SOUND PATTERN INFORMATION FROM ACQUIRED IMAGE
S210
REGISTER USER IMAGE AND EACH PIECE OF INFORMATION
S12
SET PARAMETERS FOR USER IMAGE
S13
DISPLAY USER IMAGE AS OBJECT IN 3D SPACE
S14
END

FIG.39

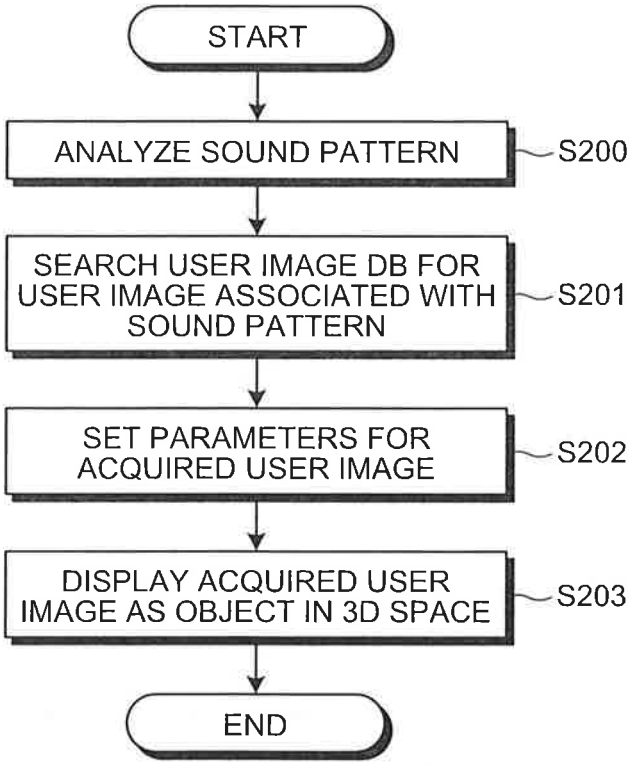

START
ANALYZE SOUND PATTERN
S200
SEARCH USER IMAGE DB FOR USER IMAGE ASSOCIATED WITH SOUND PATTERN
S201
SET PARAMETERS FOR ACQUIRED USER IMAGE
S202
DISPLAY ACQUIRED USER IMAGE AS OBJECT IN 3D SPACE
S203
END

FIG.40

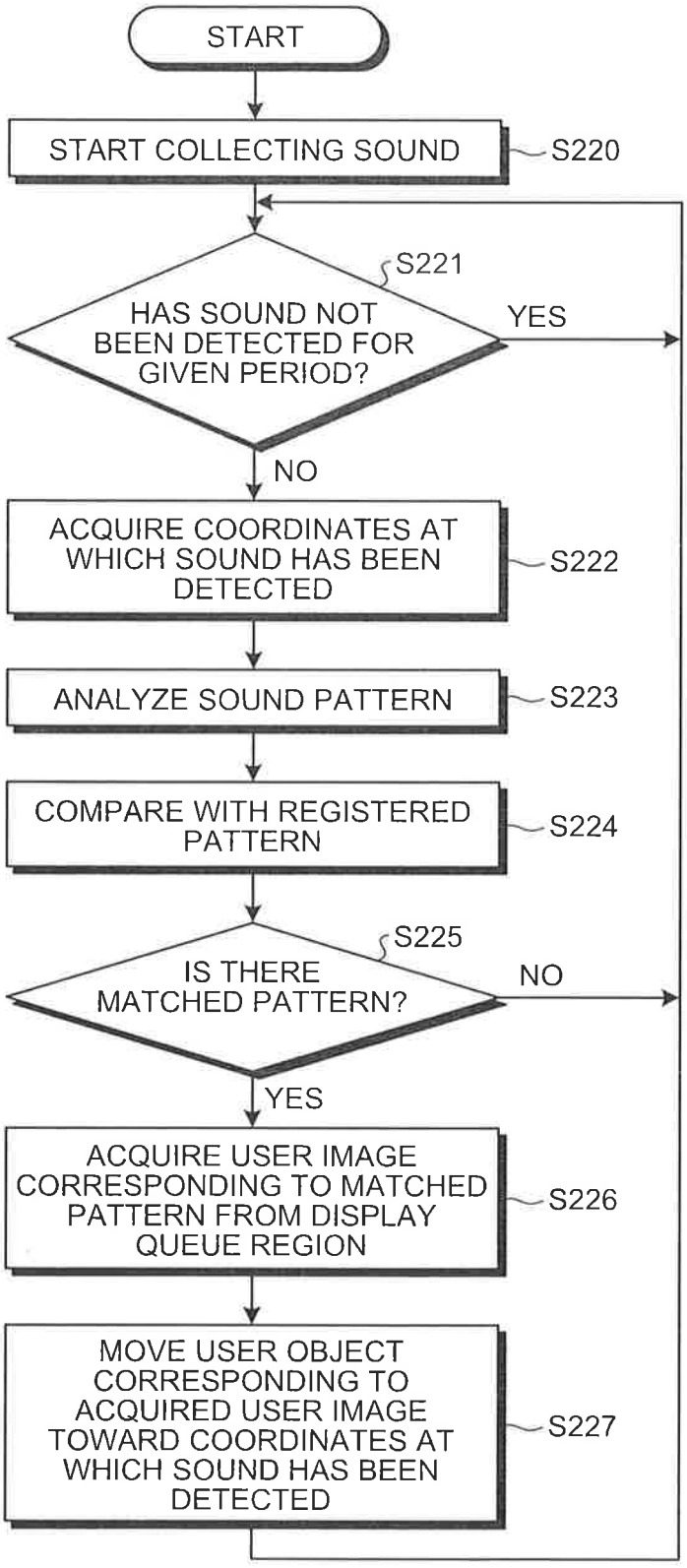

START
START COLLECTING SOUND
S220
S221
HAS SOUND NOT BEEN DETECTED FOR GIVEN PERIOD?
YES
NO
ACQUIRE COORDINATES AT WHICH SOUND HAS BEEN DETECTED
S222
ANALYZE SOUND PATTERN
S223
COMPARE WITH REGISTERED PATTERN
S224
S225
IS THERE MATCHED PATTERN?
NO
YES
ACQUIRE USER IMAGE CORRESPONDING TO MATCHED PATTERN FROM DISPLAY QUEUE REGION
S226
MOVE USER OBJECT CORRESPONDING TO ACQUIRED USER IMAGE TOWARD COORDINATES AT WHICH SOUND HAS BEEN DETECTED
S227

FIG.41

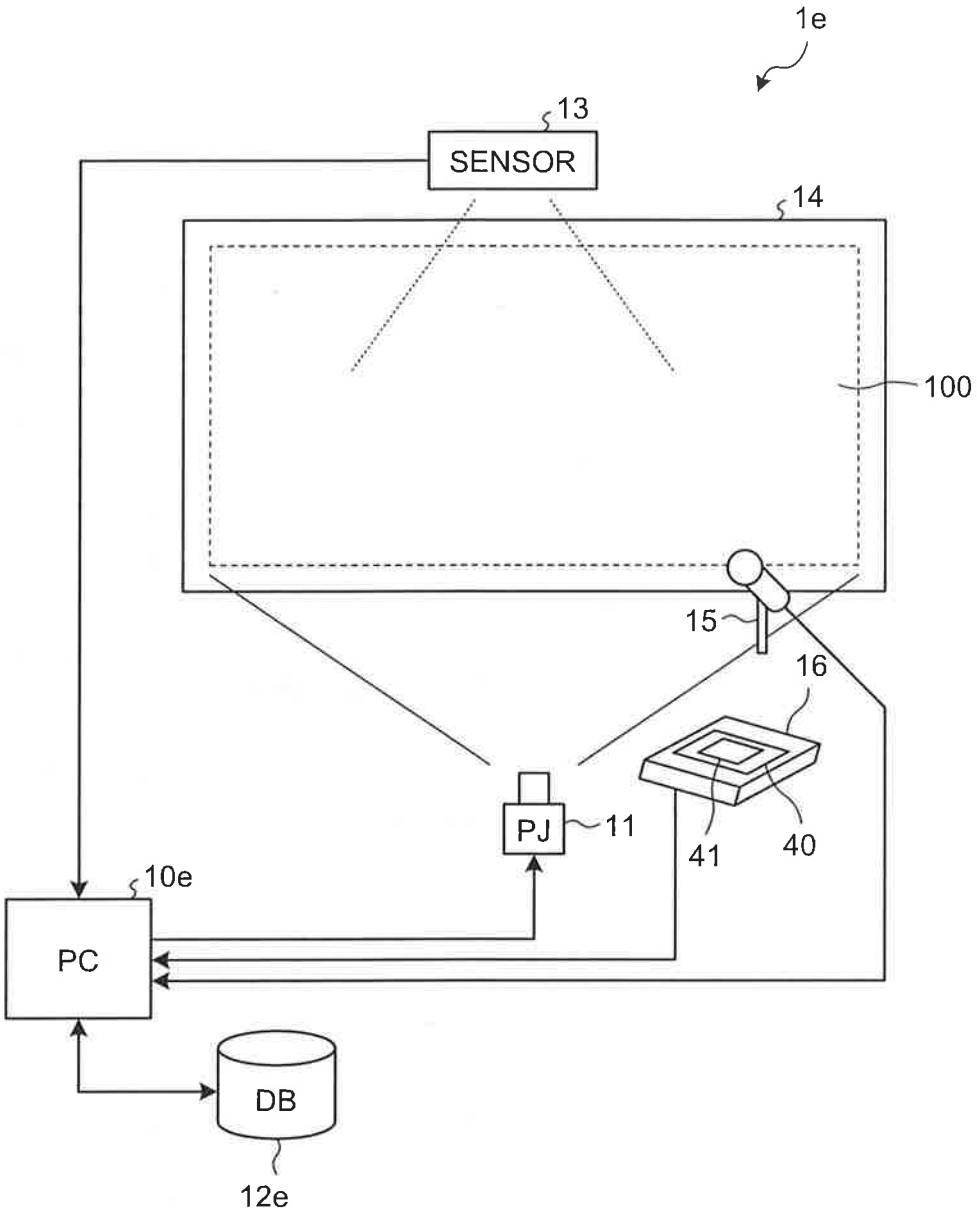
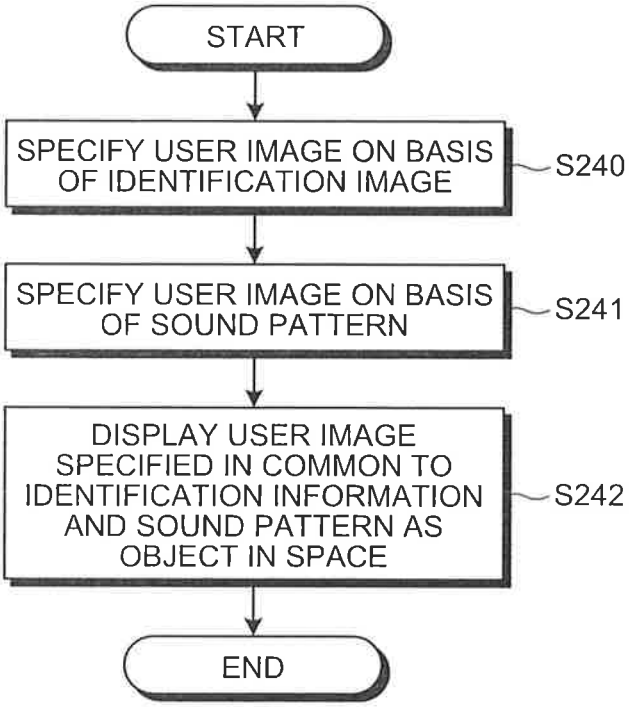


FIG.42


START
SPECIFY USER IMAGE ON BASIS OF IDENTIFICATION IMAGE
S240
SPECIFY USER IMAGE ON BASIS OF SOUND PATTERN
S241
DISPLAY USER IMAGE SPECIFIED IN COMMON TO IDENTIFICATION INFORMATION AND SOUND PATTERN AS OBJECT IN SPACE
S242
END

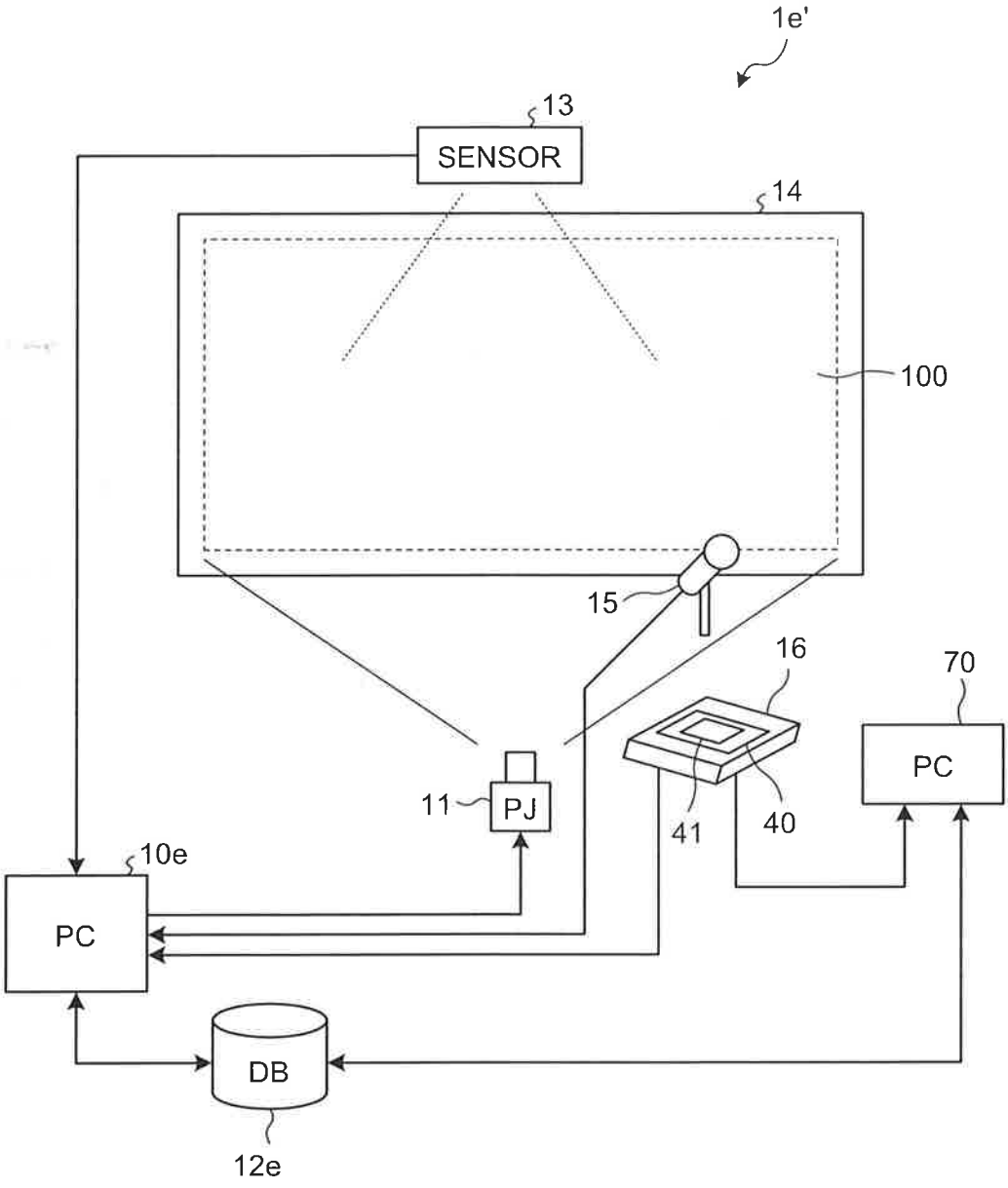



FIG.43