FIG. 1

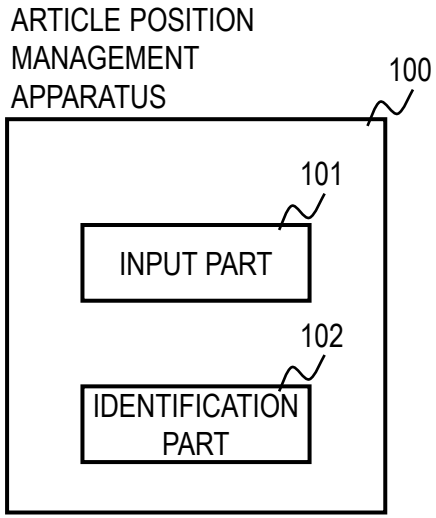

ARTICLE POSITION MANAGEMENT APPARATUS
100
101
INPUT PART
102
IDENTIFICATION PART

FIG. 2

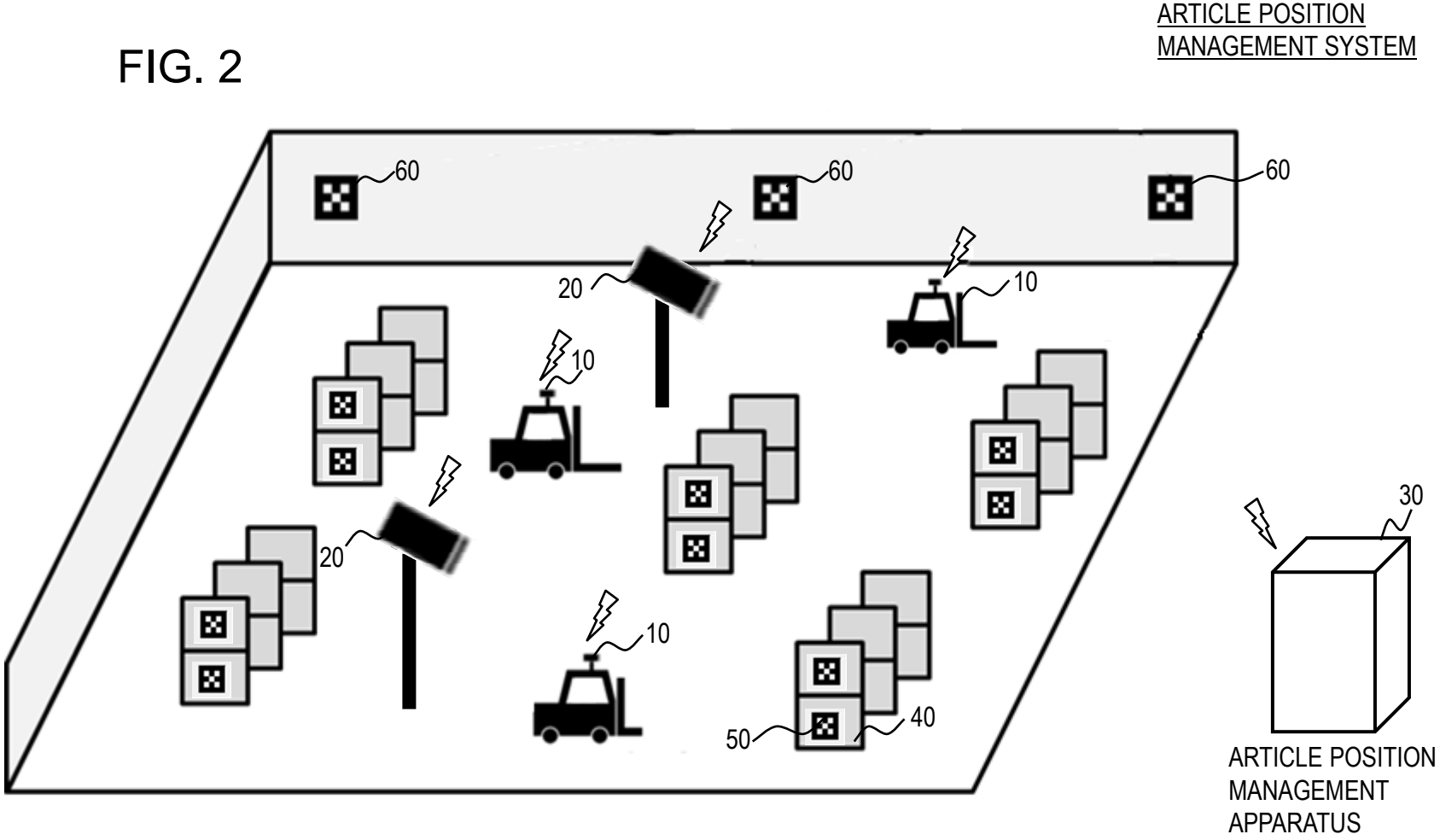

ARTICLE POSITION MANAGEMENT SYSTEM
60
60
60
20
10
10
20
10
50
40
30
ARTICLE POSITION MANAGEMENT APPARATUS

FIG. 3

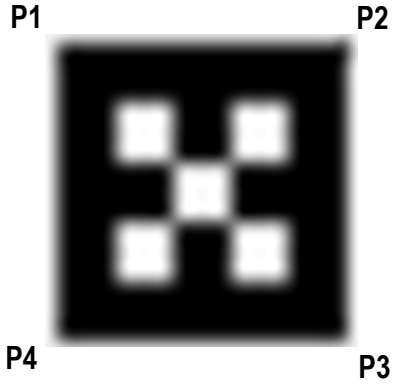


FIG. 4

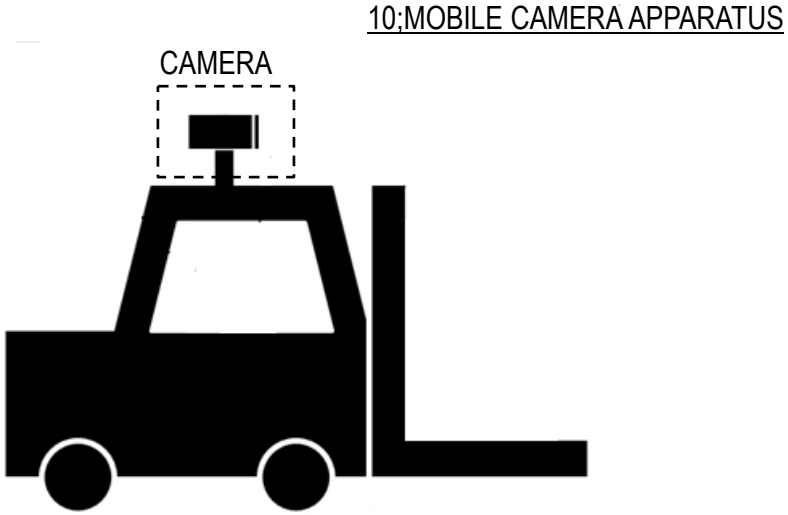


FIG. 5

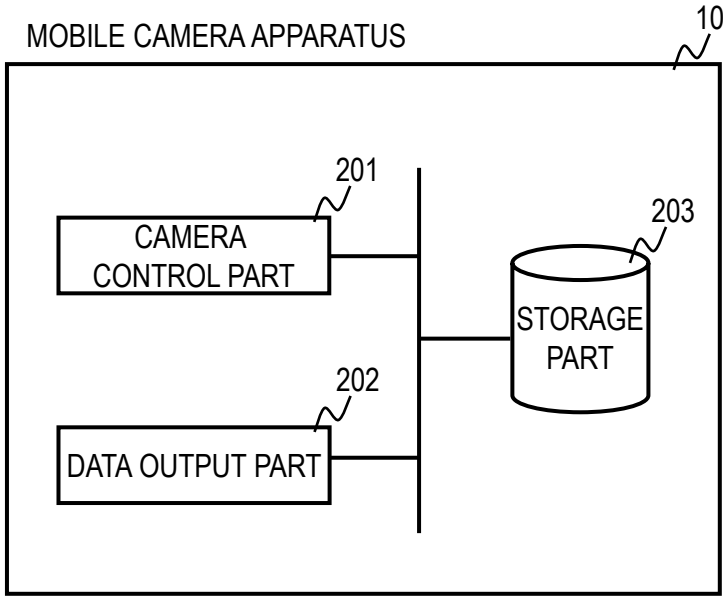

MOBILE CAMERA APPARATUS
10
201
CAMERA CONTROL PART
203
STORAGE PART
202
DATA OUTPUT PART

FIG. 6

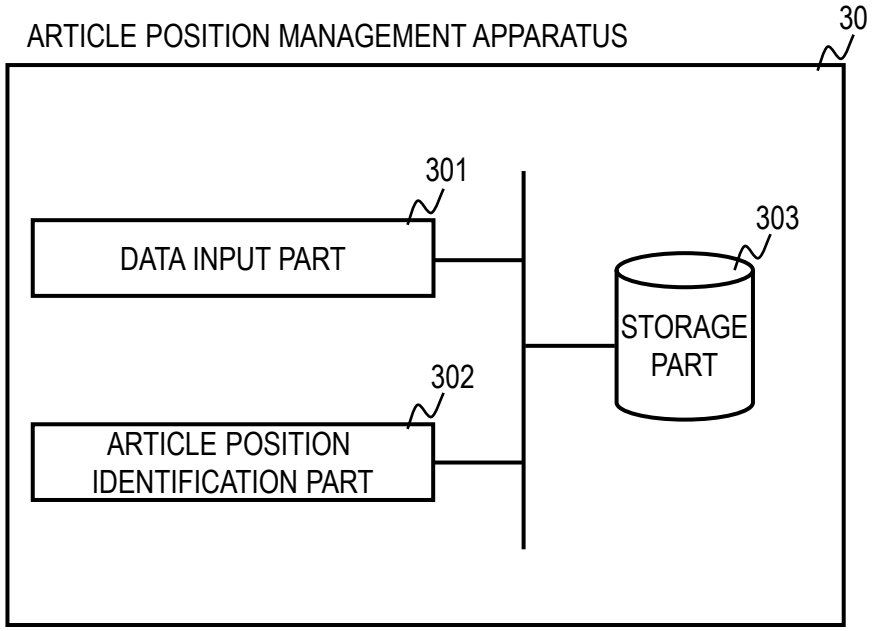

ARTICLE POSITION MANAGEMENT APPARATUS
30
301
DATA INPUT PART
303
STORAGE PART
302
ARTICLE POSITION IDENTIFICATION PART

FIG. 7

REFERENCE POINT MARKER INFORMATION

IDENTIFIER	ABSOLUTE POSITION	ABSOLUTE DIRECTION	SIZE
P_01	(x01, y01,z01)	M_01	S_01
P_02	(x02, y02,z02)	M_02	S_02
P_03	(x03, y03,z03)	M_03	S_03
⋮	⋮	⋮	⋮

FIG. 8

ARTICLE MARKER INFORMATION

ARTICLE IDENTIFIER	MARKER IDENTIFIER	SIZE
B_11	P_11	S_11
B_12	P_12	S_12
B_13	P_13	S_13
⋮	⋮	⋮

FIG. 9

CAMERA RELATED INFORMATION

CAMERA APPARATUS IDENTIFIER	TYPE	ANGLE OF VIEW, DISTORTION	ABSOLUTE POSITION	ABSOLUTE DIRECTION
ID_01	MOBILE	(θ01、D01)	-	-
ID_02	MOBILE	(θ02、D02)	-	-
⋮	⋮	⋮	⋮	⋮
ID_11	FIXED	(θ11、D11)	(x11, y11,z11)	M_11
ID_12	FIXED	(θ12、D12)	(x12, y12,z12)	M_12
⋮	⋮	⋮	⋮	⋮

FIG. 10

ARTICLE POSITION INFORMATION

ARTICLE IDENTIFIER	ABSOLUTE POSITION
B_21	(x21, y21,z21)
B_22	(x22, y22,z22)
B_23	(x23, y23,z23)
⋮	⋮

FIG. 11

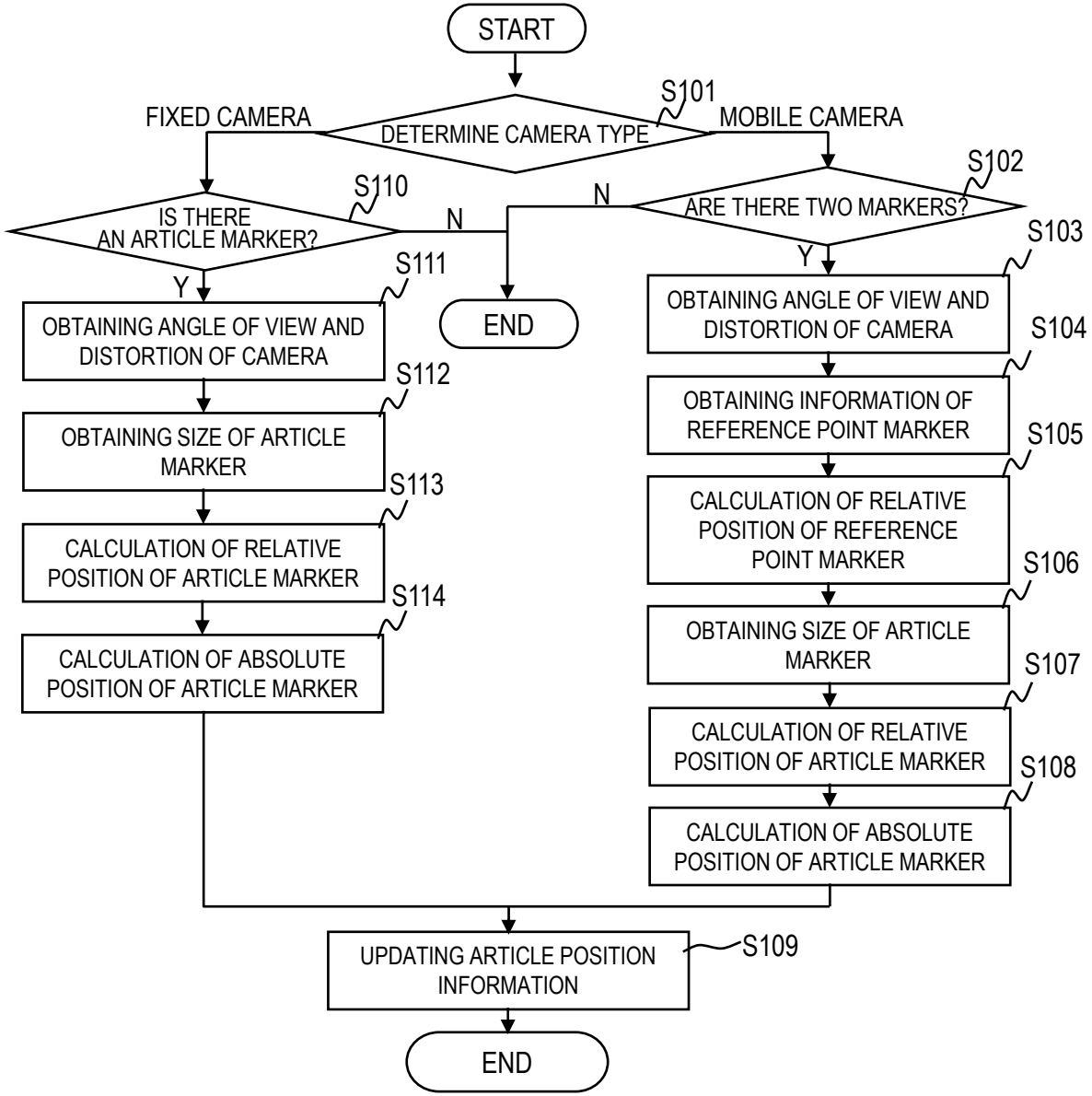

START
S101
DETERMINE CAMERA TYPE
FIXED CAMERA
MOBILE CAMERA
S110
IS THERE AN ARTICLE MARKER?
N
Y
S102
ARE THERE TWO MARKERS?
N
Y
END
S111
OBTAINING ANGLE OF VIEW AND DISTORTION OF CAMERA
S112
OBTAINING SIZE OF ARTICLE MARKER
S113
CALCULATION OF RELATIVE POSITION OF ARTICLE MARKER
S114
CALCULATION OF ABSOLUTE POSITION OF ARTICLE MARKER
S103
OBTAINING ANGLE OF VIEW AND DISTORTION OF CAMERA
S104
OBTAINING INFORMATION OF REFERENCE POINT MARKER
S105
CALCULATION OF RELATIVE POSITION OF REFERENCE POINT MARKER
S106
OBTAINING SIZE OF ARTICLE MARKER
S107
CALCULATION OF RELATIVE POSITION OF ARTICLE MARKER
S108
CALCULATION OF ABSOLUTE POSITION OF ARTICLE MARKER
S109
UPDATING ARTICLE POSITION INFORMATION
END

FIG. 12

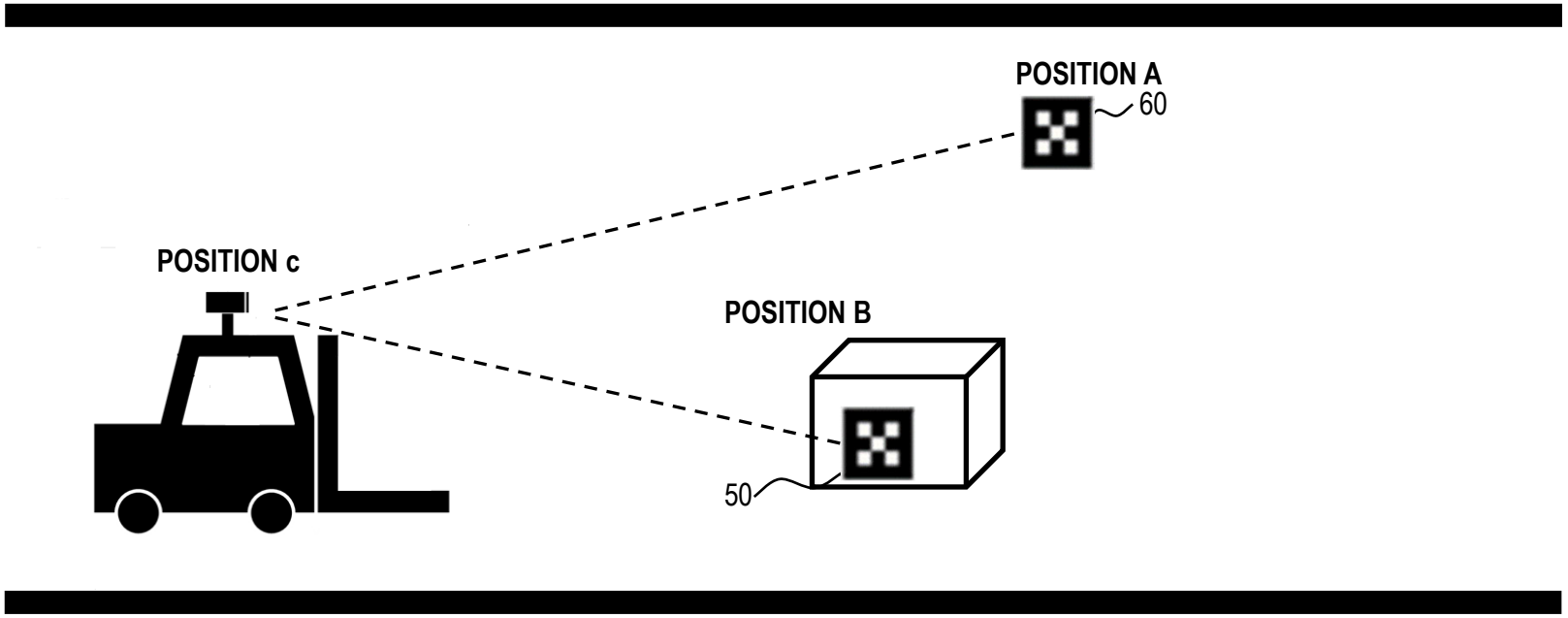


FIG. 13

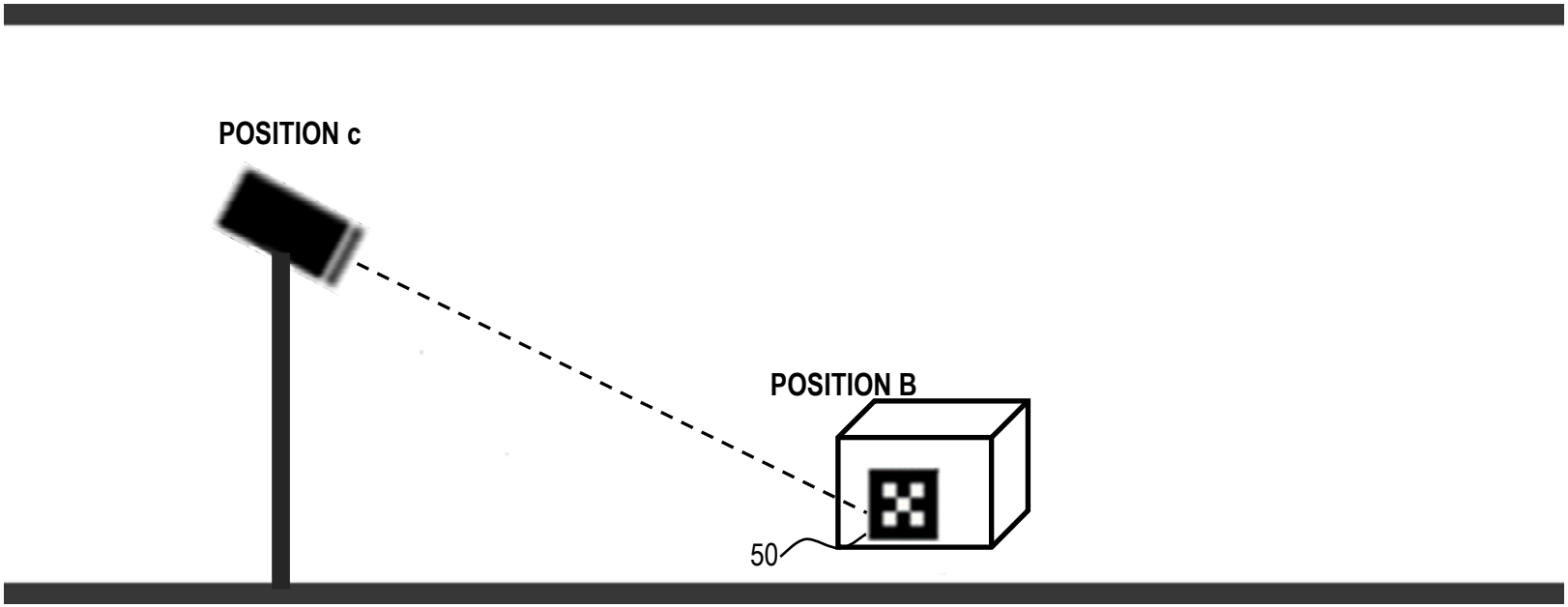


FIG. 14

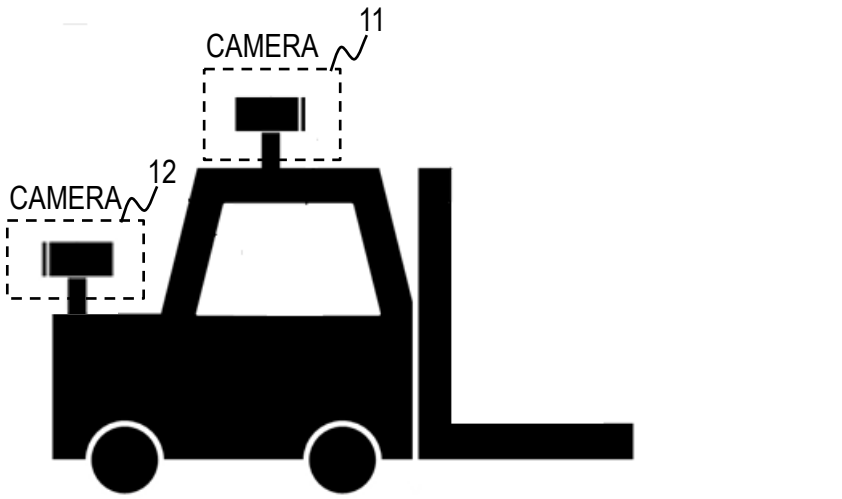


FIG. 15

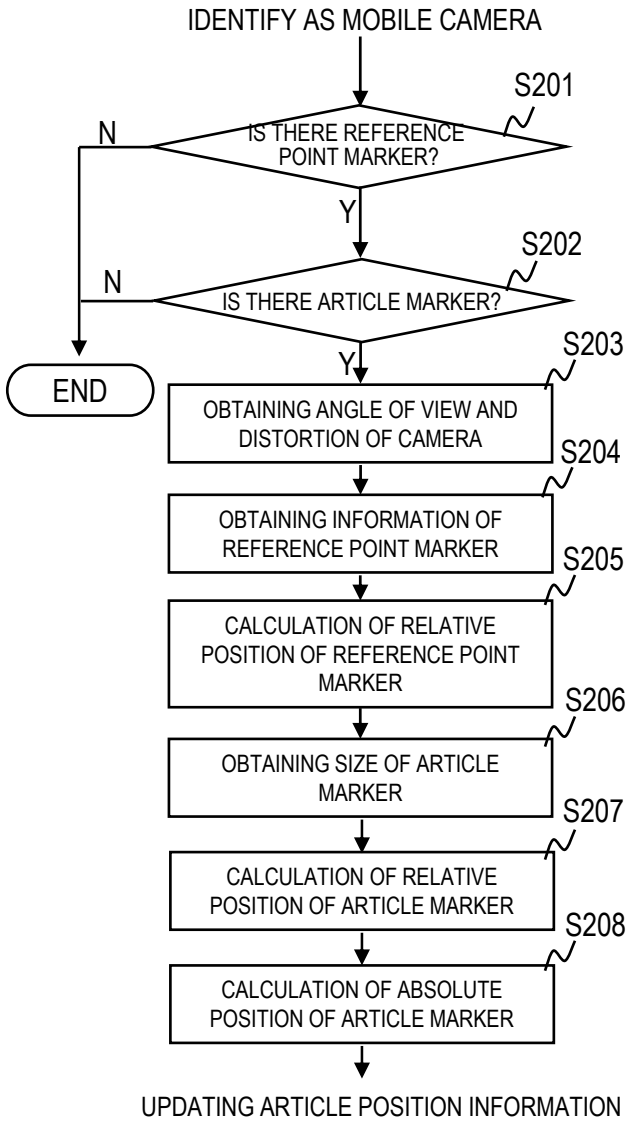

IDENTIFY AS MOBILE CAMERA
S201
IS THERE REFERENCE POINT MARKER?
N
Y
S202
IS THERE ARTICLE MARKER?
N
Y
END
S203
OBTAINING ANGLE OF VIEW AND DISTORTION OF CAMERA
S204
OBTAINING INFORMATION OF REFERENCE POINT MARKER
S205
CALCULATION OF RELATIVE POSITION OF REFERENCE POINT MARKER
S206
OBTAINING SIZE OF ARTICLE MARKER
S207
CALCULATION OF RELATIVE POSITION OF ARTICLE MARKER
S208
CALCULATION OF ABSOLUTE POSITION OF ARTICLE MARKER
UPDATING ARTICLE POSITION INFORMATION

FIG. 16

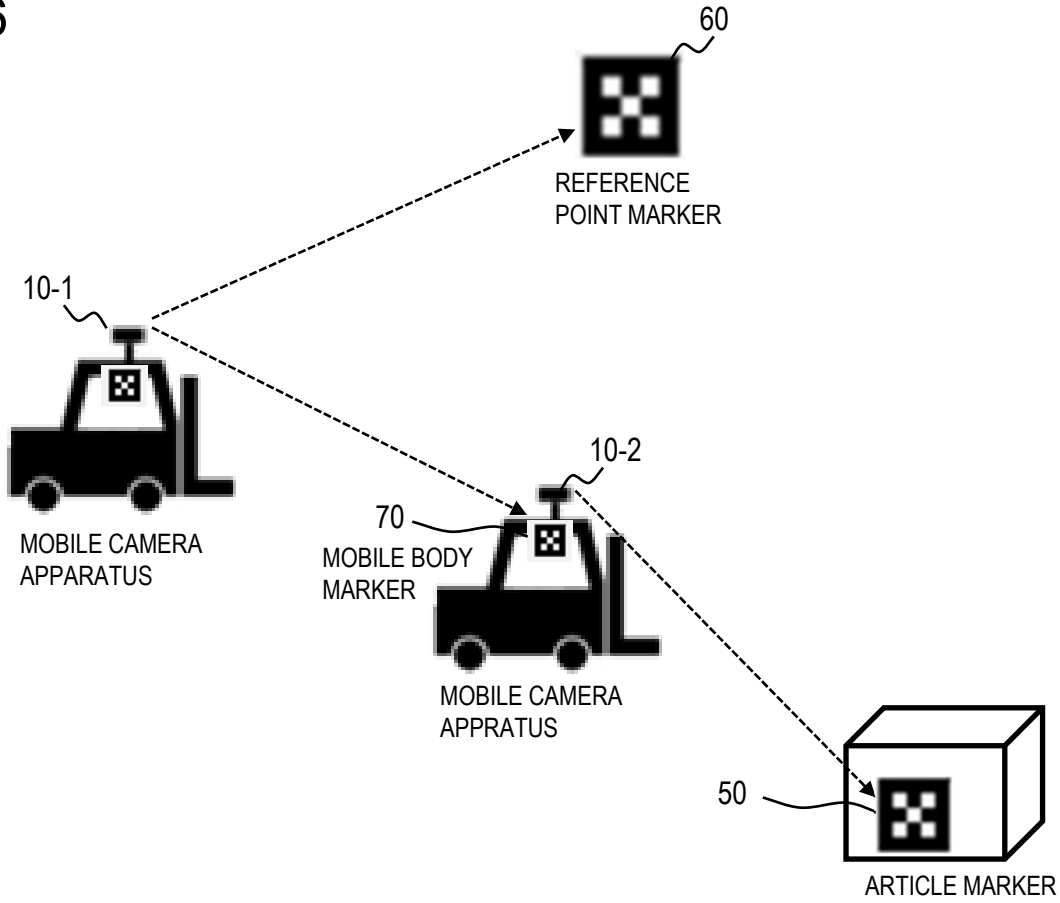

60
REFERENCE
POINT MARKER
10-1
MOBILE CAMERA
APPARATUS
10-2
70
MOBILE BODY
MARKER
MOBILE CAMERA
APPRATUS
50
ARTICLE MARKER

FIG. 17

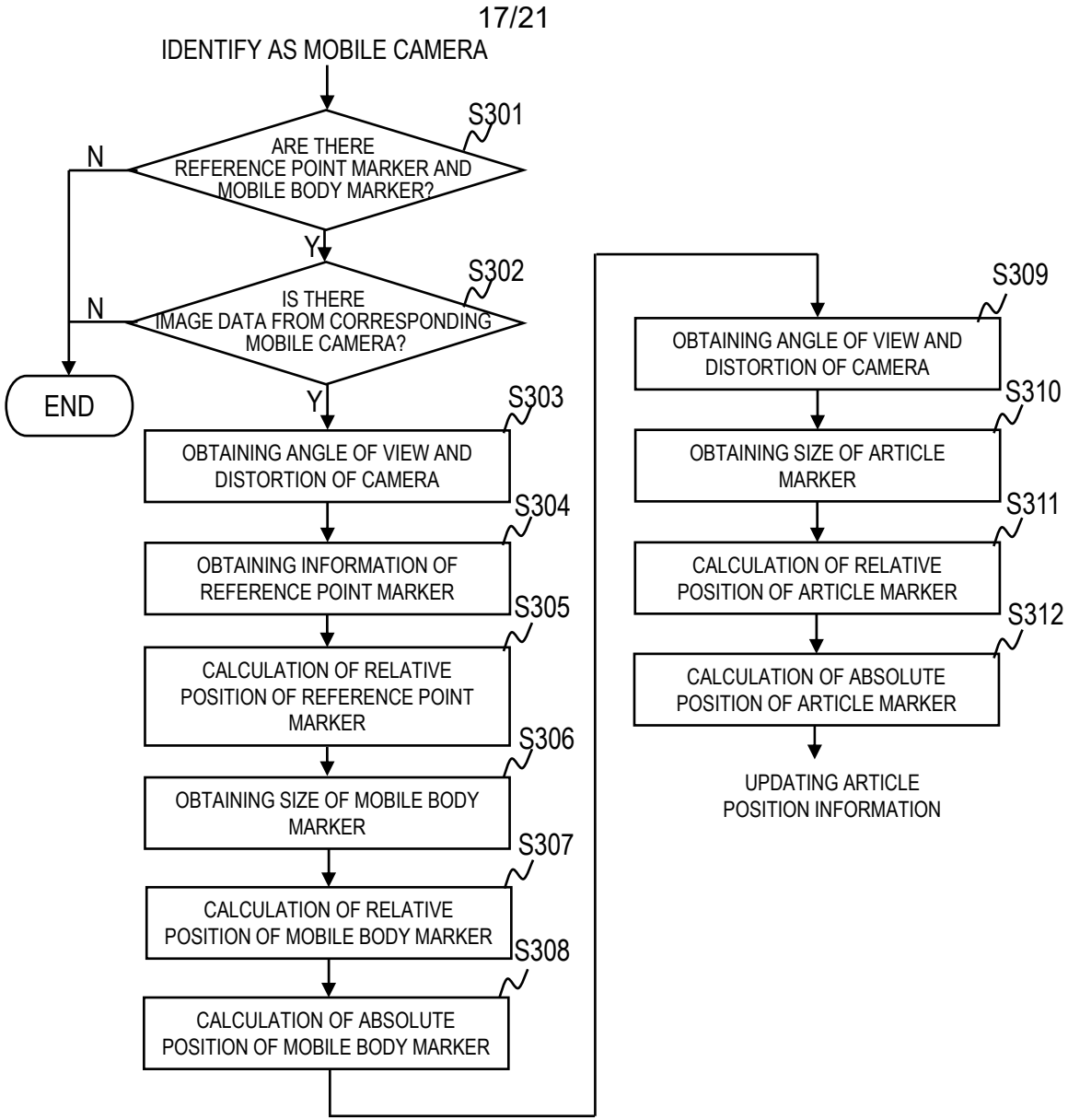

IDENTIFY AS MOBILE CAMERA
S301
ARE THERE REFERENCE POINT MARKER AND MOBILE BODY MARKER?
N
Y
S302
IS THERE IMAGE DATA FROM CORRESPONDING MOBILE CAMERA?
N
Y
END
S303
OBTAINING ANGLE OF VIEW AND DISTORTION OF CAMERA
S304
OBTAINING INFORMATION OF REFERENCE POINT MARKER
S305
CALCULATION OF RELATIVE POSITION OF REFERENCE POINT MARKER
S306
OBTAINING SIZE OF MOBILE BODY MARKER
S307
CALCULATION OF RELATIVE POSITION OF MOBILE BODY MARKER
S308
CALCULATION OF ABSOLUTE POSITION OF MOBILE BODY MARKER
S309
OBTAINING ANGLE OF VIEW AND DISTORTION OF CAMERA
S310
OBTAINING SIZE OF ARTICLE MARKER
S311
CALCULATION OF RELATIVE POSITION OF ARTICLE MARKER
S312
CALCULATION OF ABSOLUTE POSITION OF ARTICLE MARKER
UPDATING ARTICLE POSITION INFORMATION

FIG. 18

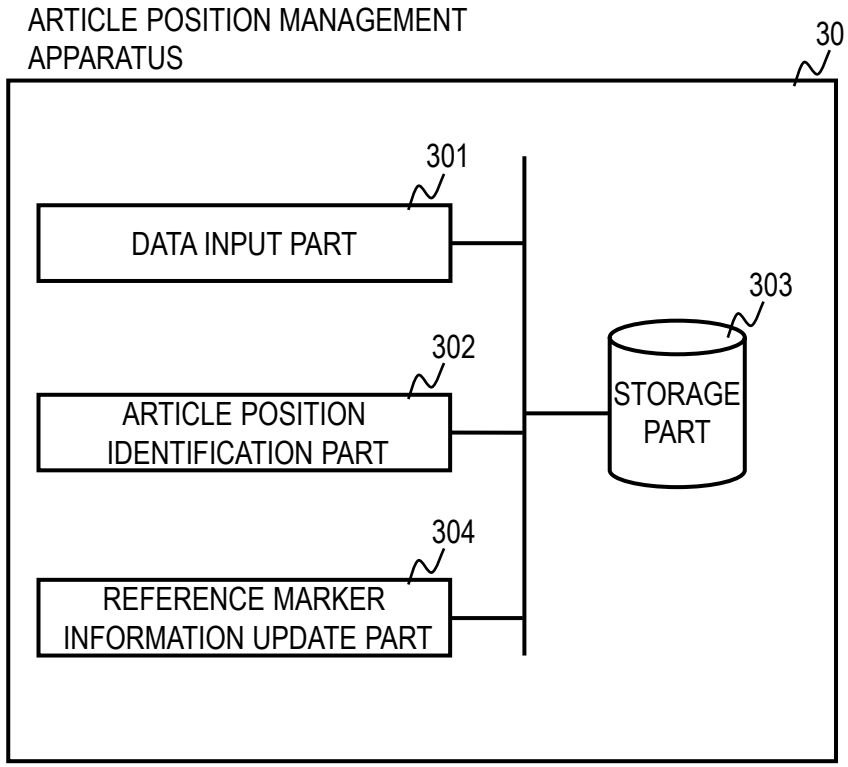

ARTICLE POSITION MANAGEMENT APPARATUS
30
301
DATA INPUT PART
303
302
ARTICLE POSITION IDENTIFICATION PART
STORAGE PART
304
REFERENCE MARKER INFORMATION UPDATE PART

FIG. 19

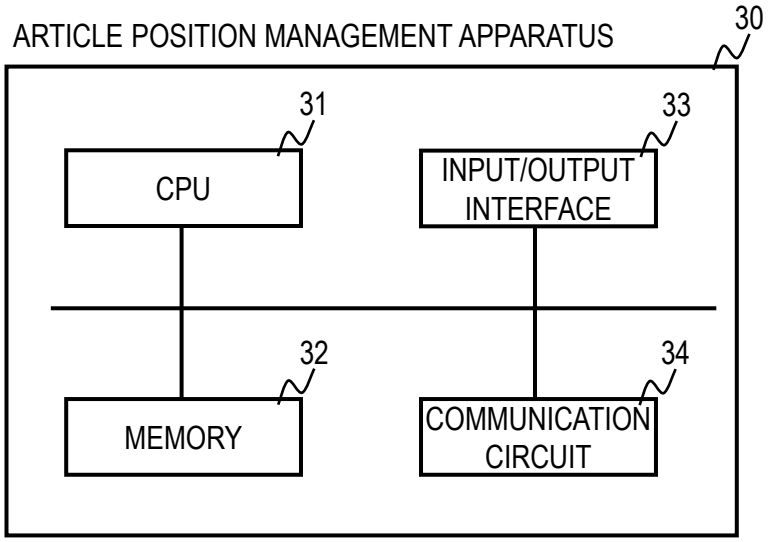

ARTICLE POSITION MANAGEMENT APPARATUS
30
31
CPU
33
INPUT/OUTPUT INTERFACE
32
MEMORY
34
COMMUNICATION CIRCUIT

FIG. 20

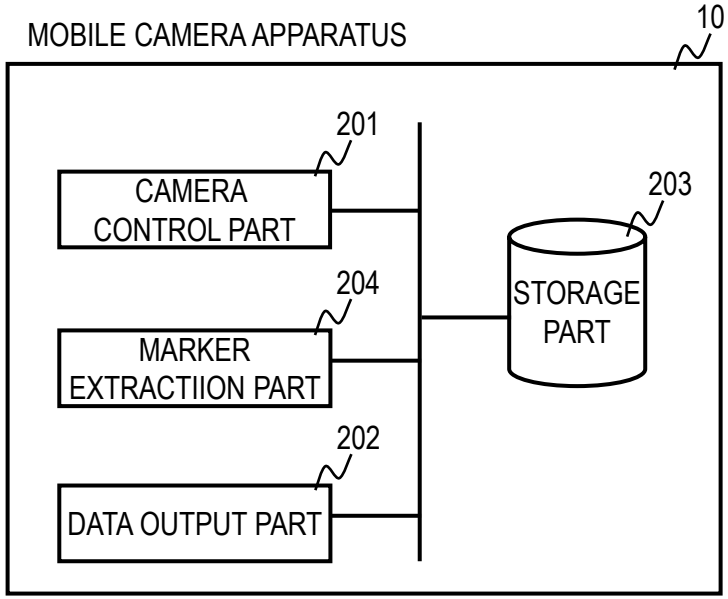
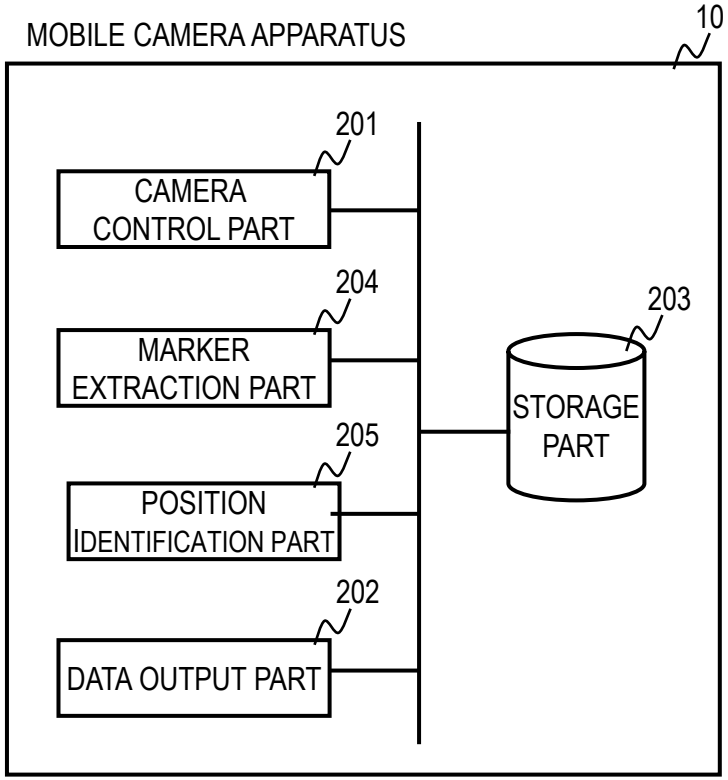

MOBILE CAMERA APPARATUS
10
201
CAMERA CONTROL PART
203
STORAGE PART
204
MARKER EXTRACTIION PART
202
DATA OUTPUT PART

FIG. 21


MOBILE CAMERA APPARATUS
10
201
CAMERA CONTROL PART
204
MARKER EXTRACTION PART
205
POSITION IDENTIFICATION PART
202
DATA OUTPUT PART
203
STORAGE PART