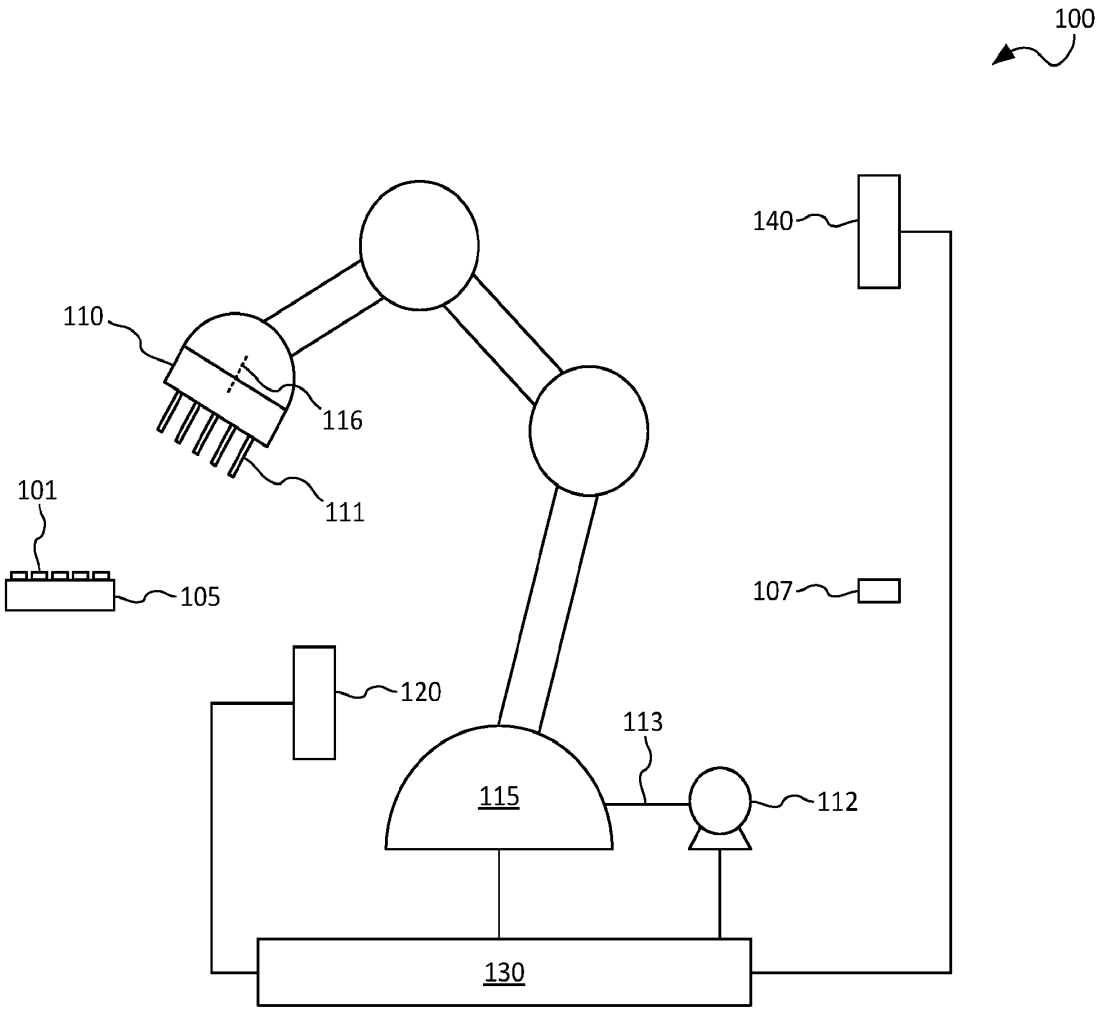
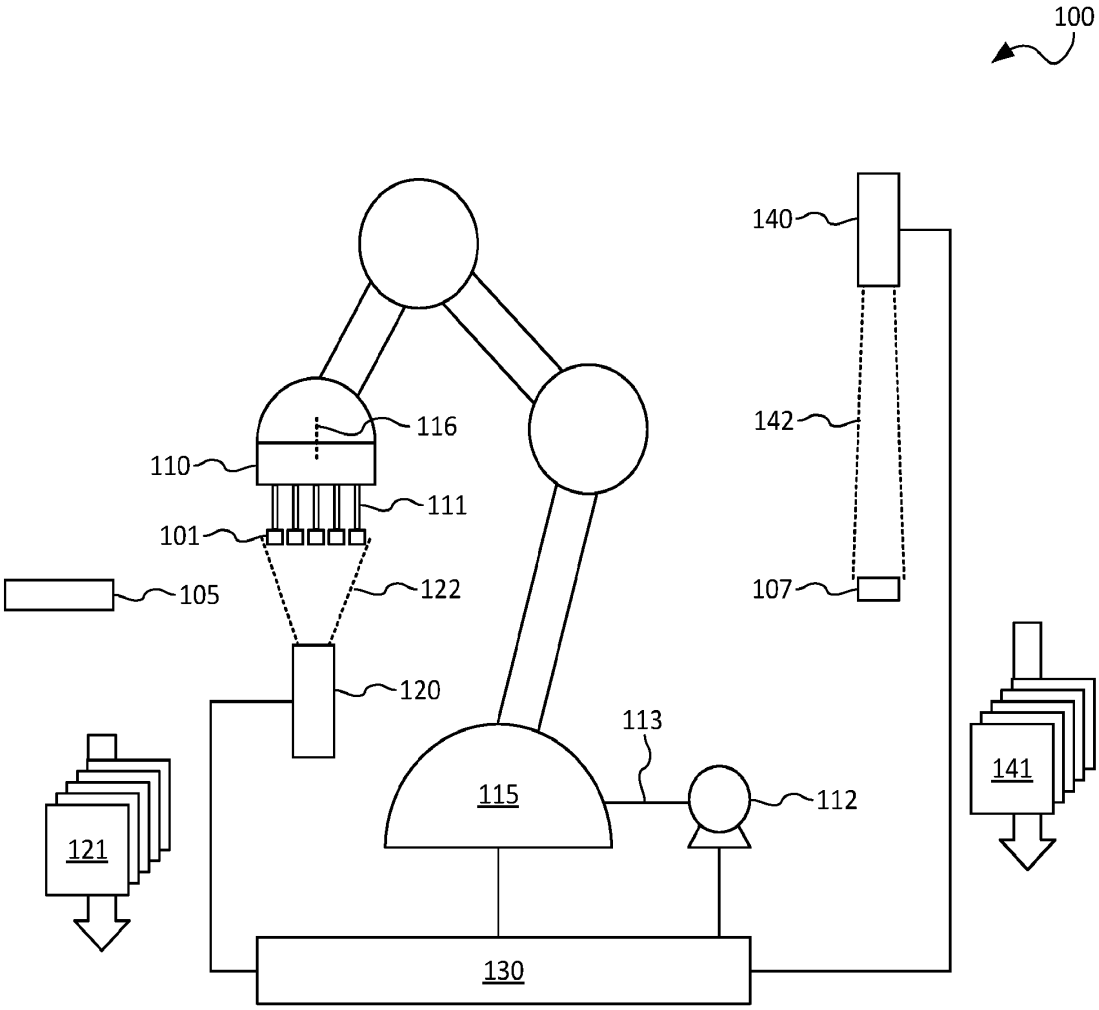


FIG. 1


100
140
142
107
116
110
111
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122
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112
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121
141
130

FIG. 2

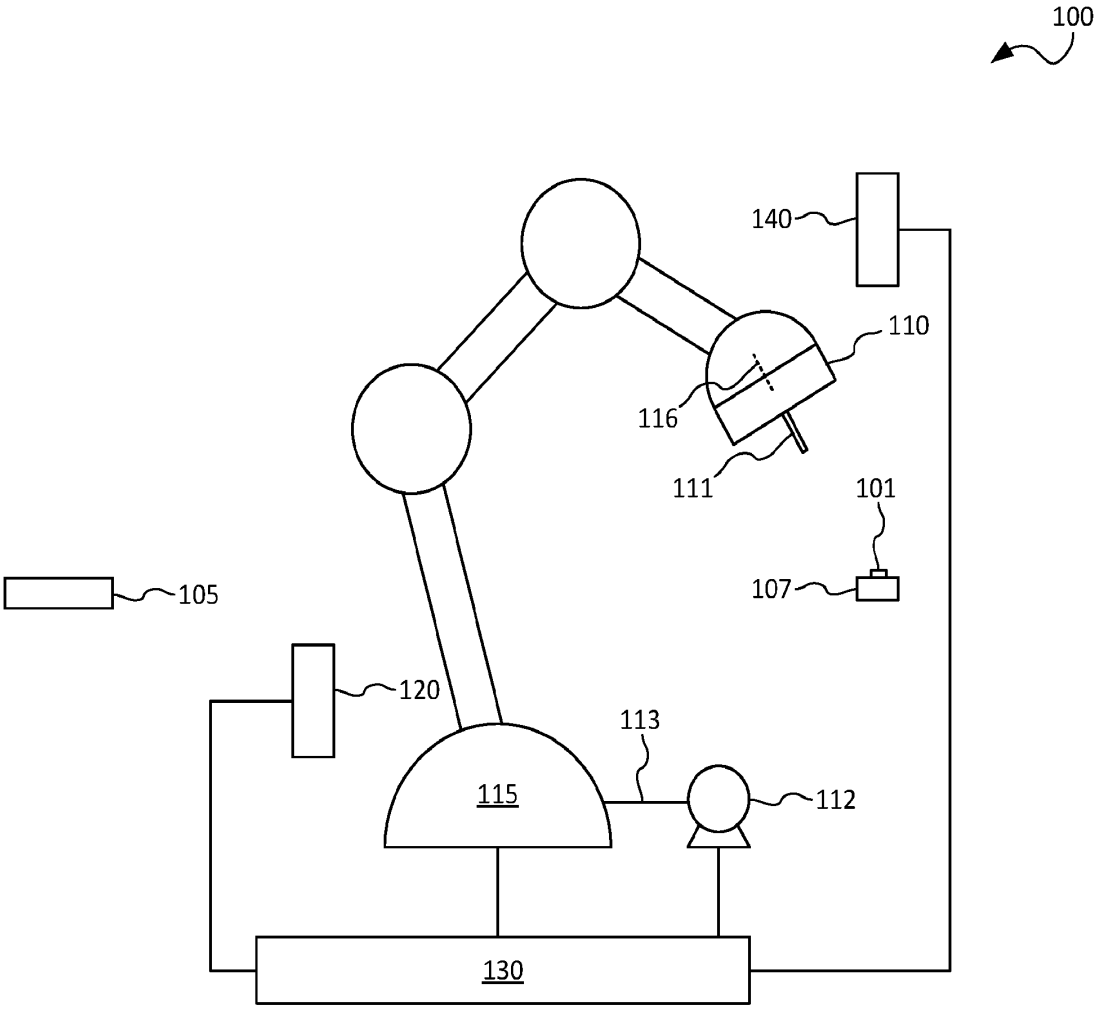

FIG. 3

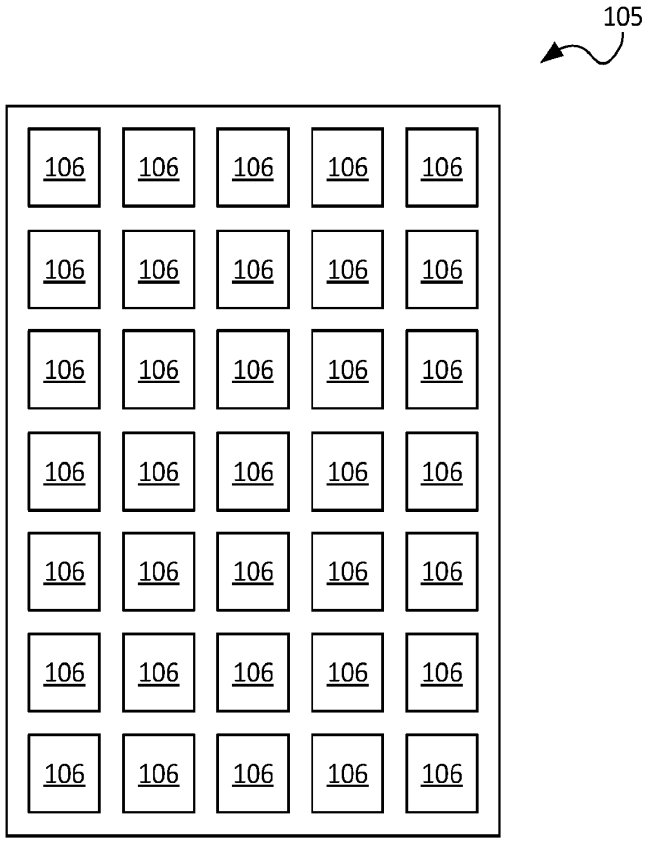
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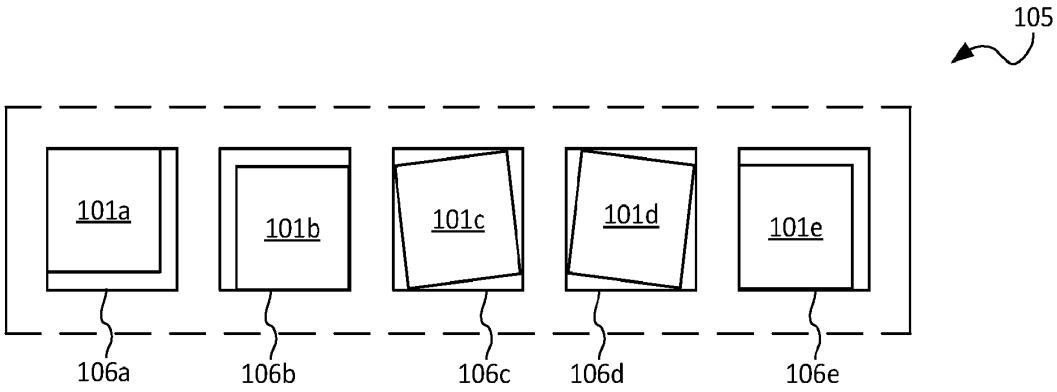
FIG. 4A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101a
101b
101c
101d
101e
106a
106b
106c
106d
106e

FIG. 4B

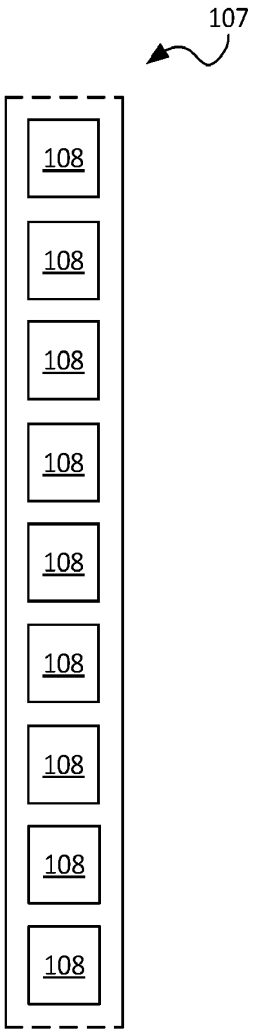
107
108
108
108
108
108
108
108
108
108

FIG. 5A

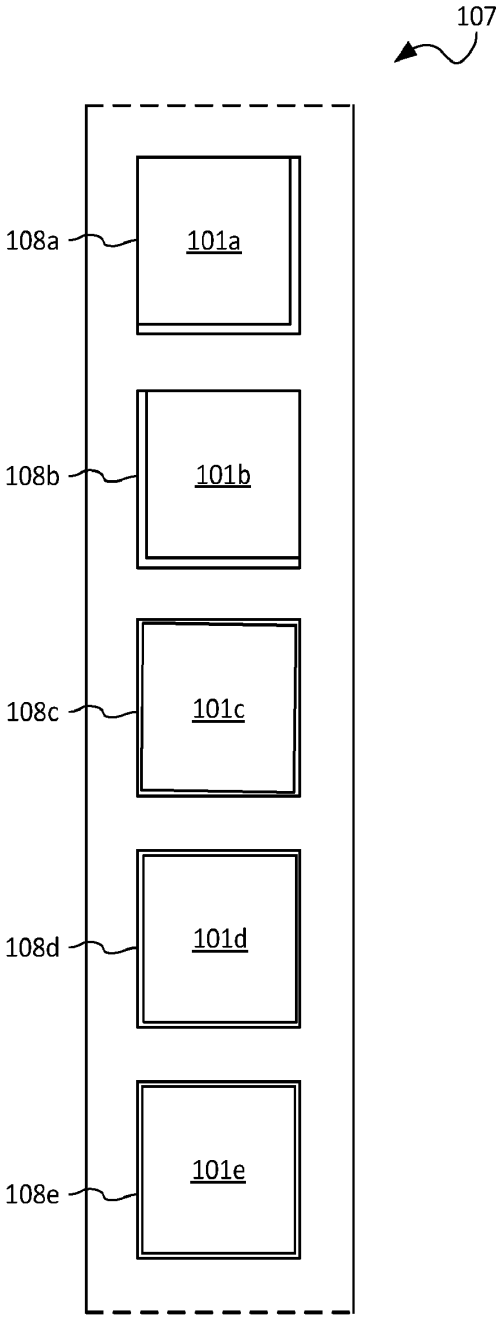
107
108a
101a
108b
101b
108c
101c
108d
101d
108e
101e

FIG. 5B

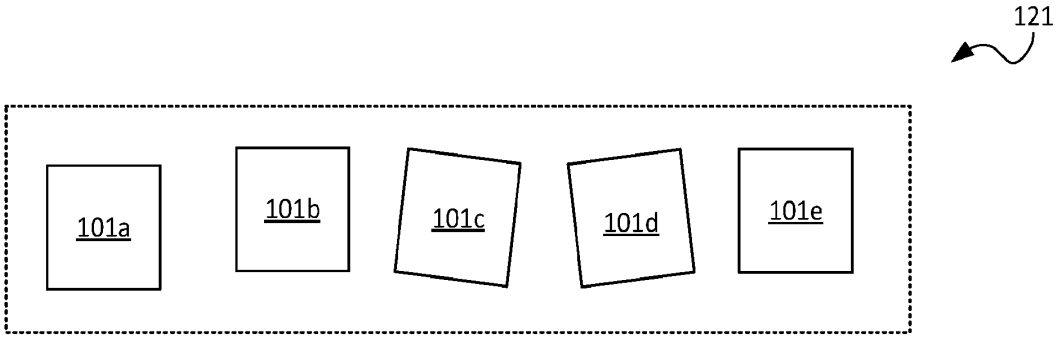

FIG. 6A

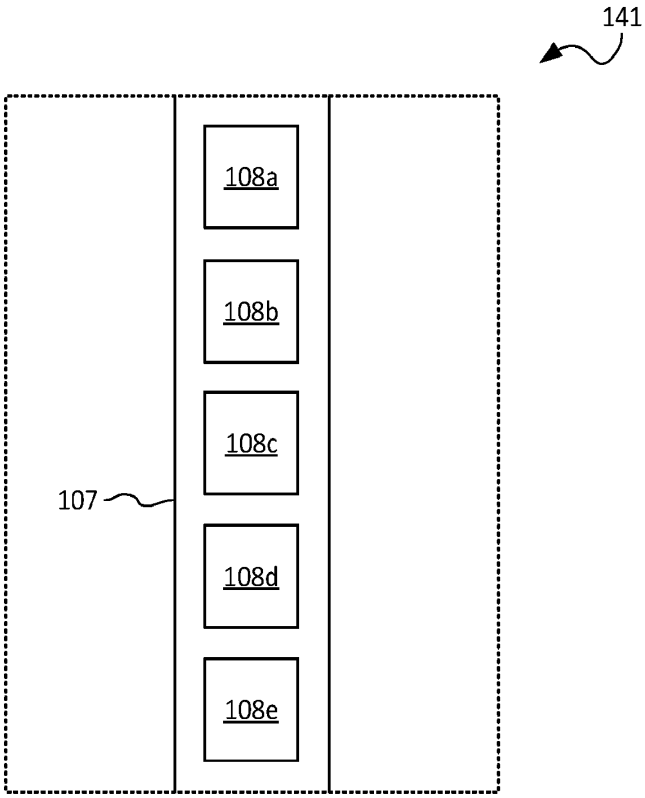

FIG. 6B

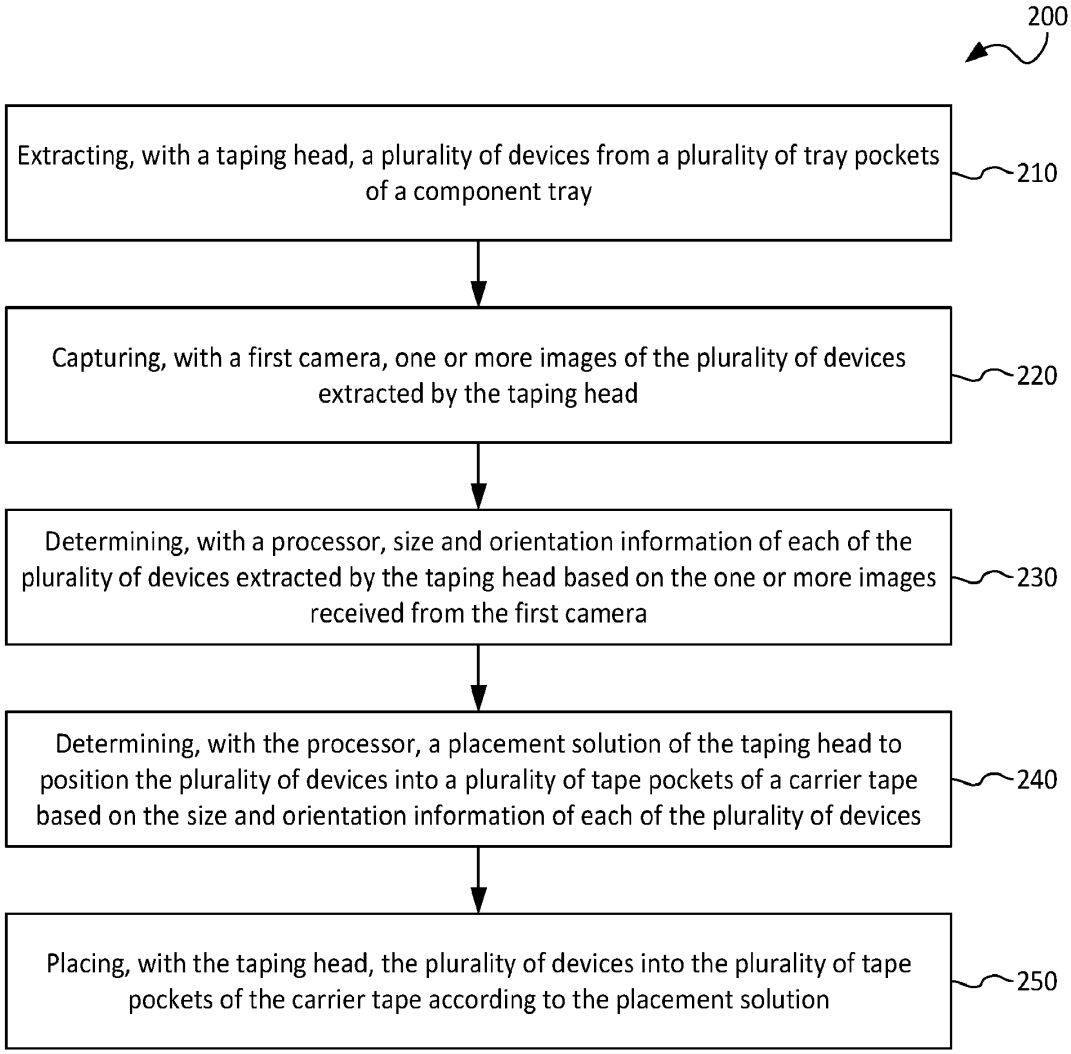
200
Extracting, with a taping head, a plurality of devices from a plurality of tray pockets of a component tray
210
Capturing, with a first camera, one or more images of the plurality of devices extracted by the taping head
220
Determining, with a processor, size and orientation information of each of the plurality of devices extracted by the taping head based on the one or more images received from the first camera
230
Determining, with the processor, a placement solution of the taping head to position the plurality of devices into a plurality of tape pockets of a carrier tape based on the size and orientation information of each of the plurality of devices
240
Placing, with the taping head, the plurality of devices into the plurality of tape pockets of the carrier tape according to the placement solution
250

FIG. 7

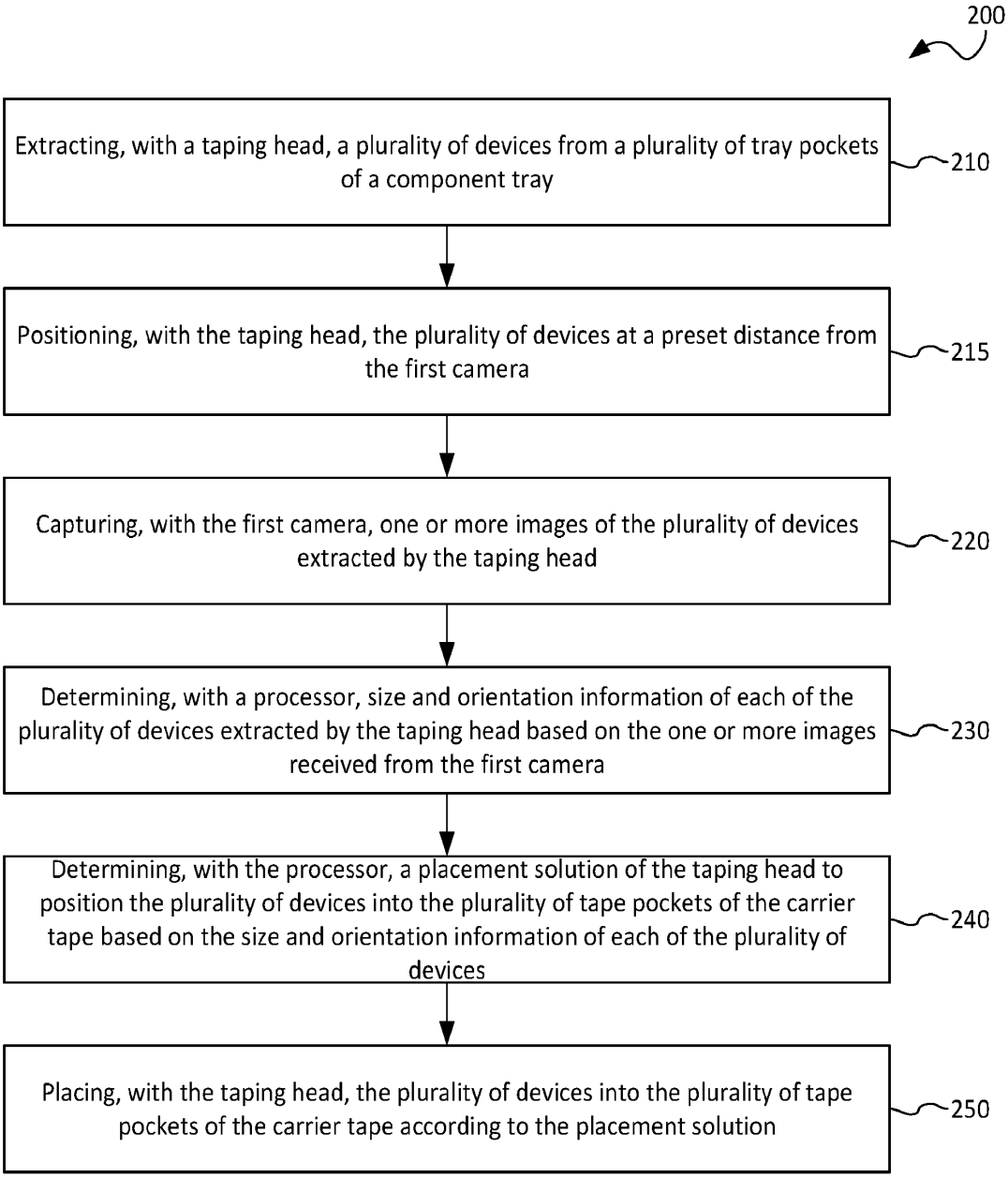
200
Extracting, with a taping head, a plurality of devices from a plurality of tray pockets of a component tray
210
Positioning, with the taping head, the plurality of devices at a preset distance from the first camera
215
Capturing, with the first camera, one or more images of the plurality of devices extracted by the taping head
220
Determining, with a processor, size and orientation information of each of the plurality of devices extracted by the taping head based on the one or more images received from the first camera
230
Determining, with the processor, a placement solution of the taping head to position the plurality of devices into the plurality of tape pockets of the carrier tape based on the size and orientation information of each of the plurality of devices
240
Placing, with the taping head, the plurality of devices into the plurality of tape pockets of the carrier tape according to the placement solution
250

FIG. 8

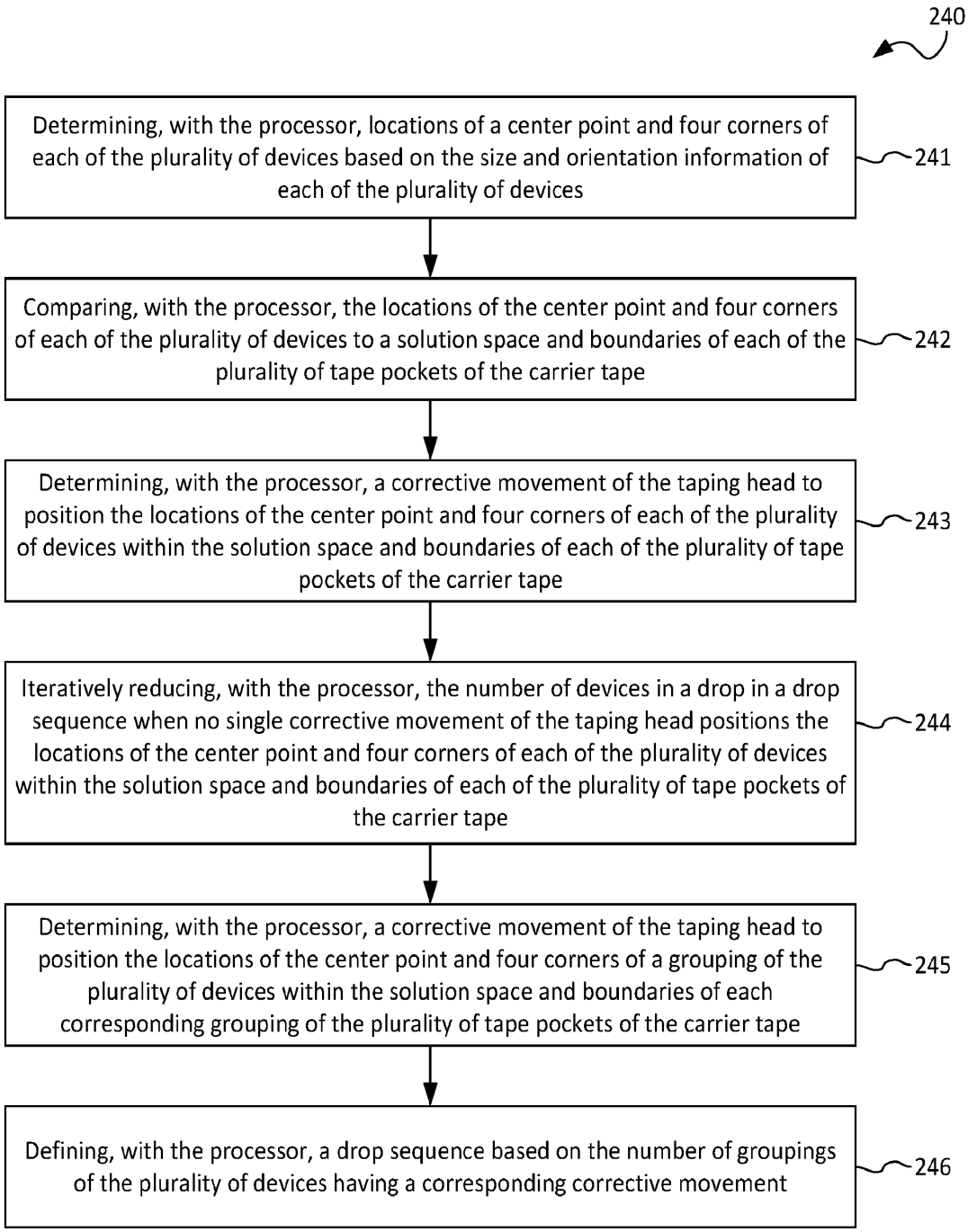
240
Determining, with the processor, locations of a center point and four corners of each of the plurality of devices based on the size and orientation information of each of the plurality of devices
241
Comparing, with the processor, the locations of the center point and four corners of each of the plurality of devices to a solution space and boundaries of each of the plurality of tape pockets of the carrier tape
242
Determining, with the processor, a corrective movement of the taping head to position the locations of the center point and four corners of each of the plurality of devices within the solution space and boundaries of each of the plurality of tape pockets of the carrier tape
243
Iteratively reducing, with the processor, the number of devices in a drop in a drop sequence when no single corrective movement of the taping head positions the locations of the center point and four corners of each of the plurality of devices within the solution space and boundaries of each of the plurality of tape pockets of the carrier tape
244
Determining, with the processor, a corrective movement of the taping head to position the locations of the center point and four corners of a grouping of the plurality of devices within the solution space and boundaries of each corresponding grouping of the plurality of tape pockets of the carrier tape
245
Defining, with the processor, a drop sequence based on the number of groupings of the plurality of devices having a corresponding corrective movement
246

FIG. 9

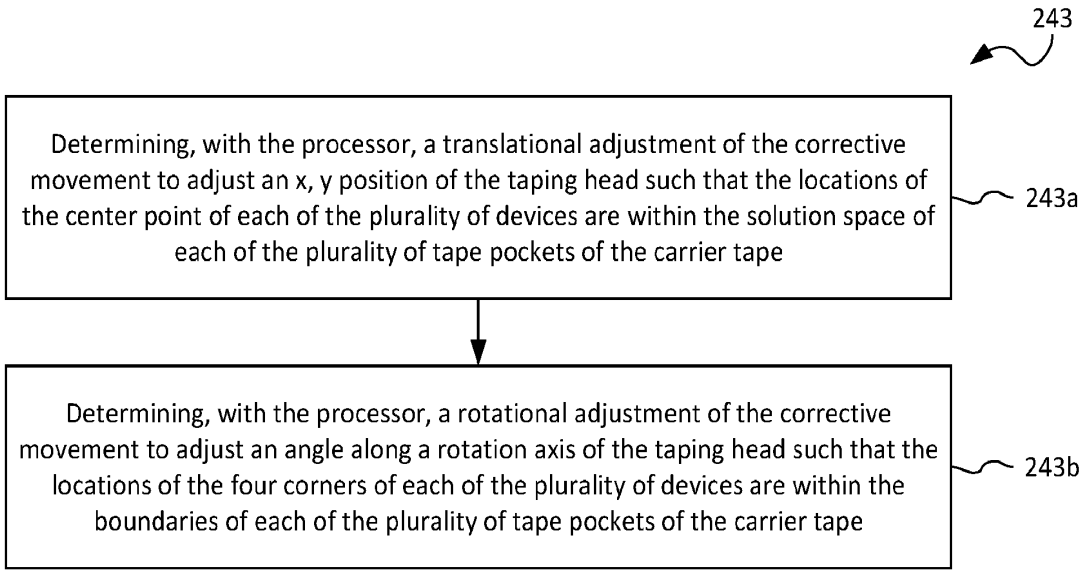
243
Determining, with the processor, a translational adjustment of the corrective movement to adjust an x, y position of the taping head such that the locations of the center point of each of the plurality of devices are within the solution space of each of the plurality of tape pockets of the carrier tape
243a
Determining, with the processor, a rotational adjustment of the corrective movement to adjust an angle along a rotation axis of the taping head such that the locations of the four corners of each of the plurality of devices are within the boundaries of each of the plurality of tape pockets of the carrier tape
243b

FIG. 10

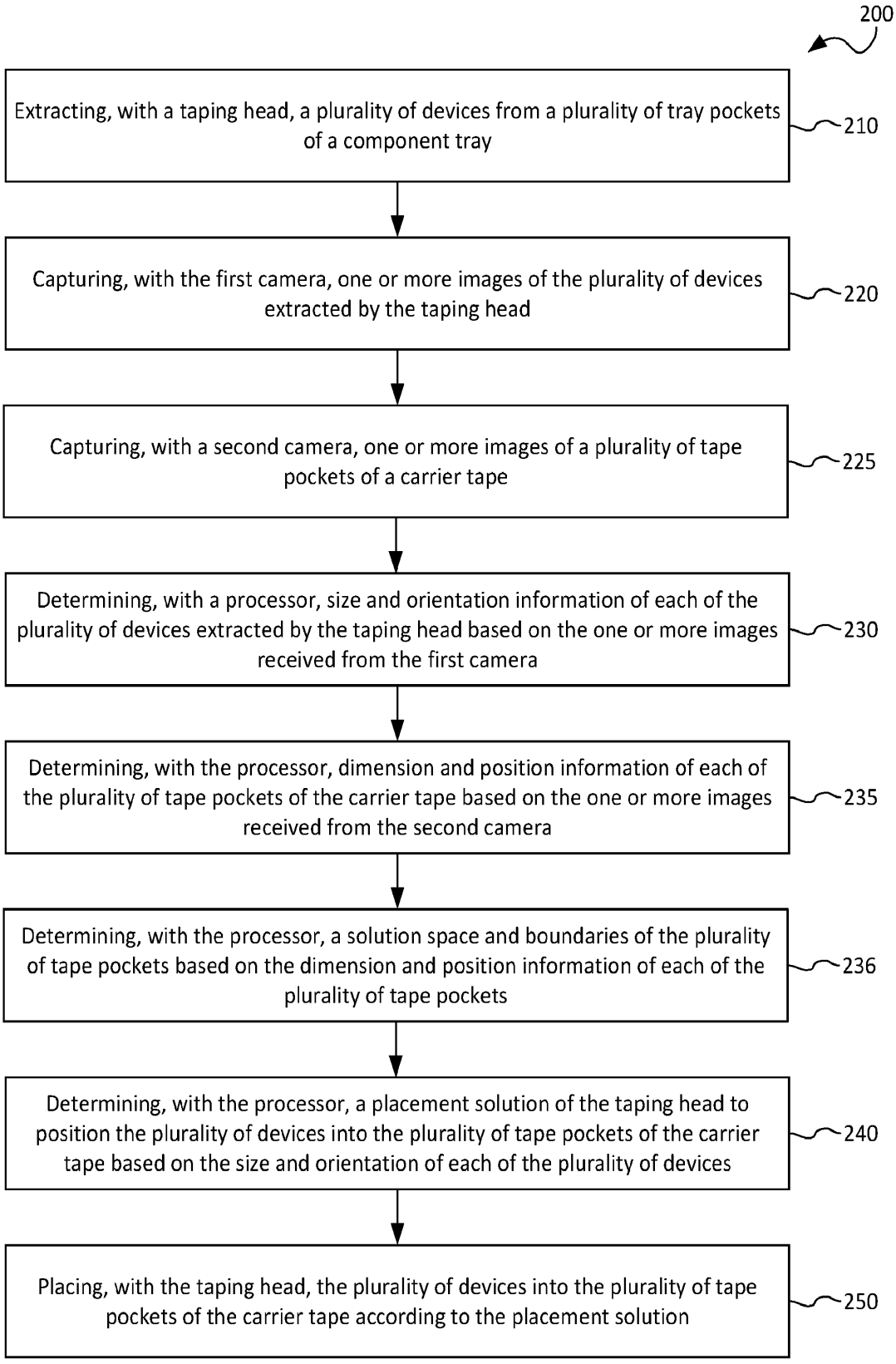
200
Extracting, with a taping head, a plurality of devices from a plurality of tray pockets of a component tray
210
Capturing, with the first camera, one or more images of the plurality of devices extracted by the taping head
220
Capturing, with a second camera, one or more images of a plurality of tape pockets of a carrier tape
225
Determining, with a processor, size and orientation information of each of the plurality of devices extracted by the taping head based on the one or more images received from the first camera
230
Determining, with the processor, dimension and position information of each of the plurality of tape pockets of the carrier tape based on the one or more images received from the second camera
235
Determining, with the processor, a solution space and boundaries of the plurality of tape pockets based on the dimension and position information of each of the plurality of tape pockets
236
Determining, with the processor, a placement solution of the taping head to position the plurality of devices into the plurality of tape pockets of the carrier tape based on the size and orientation of each of the plurality of devices
240
Placing, with the taping head, the plurality of devices into the plurality of tape pockets of the carrier tape according to the placement solution
250

FIG. 11