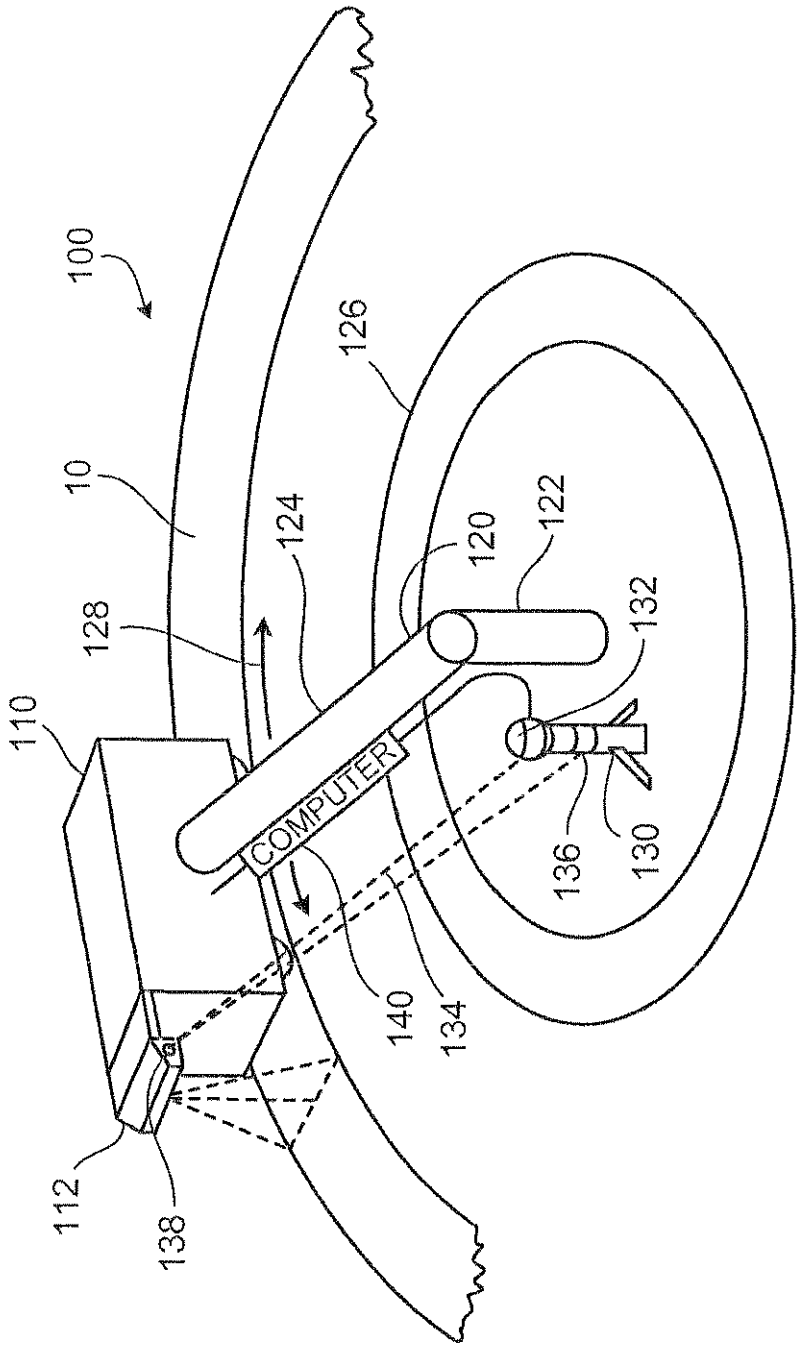

100
10
126
124
120
122
128
132
110
COMPUTER
136
130
140
134
112
138

FIG. 1

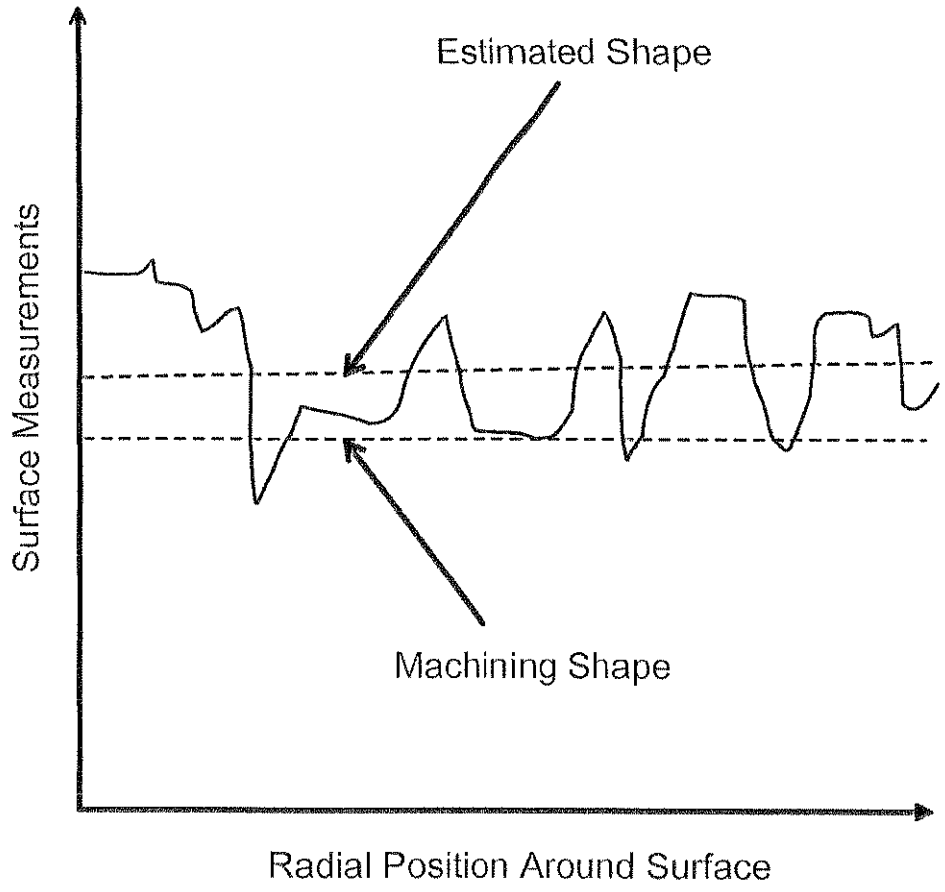

Estimated Shape
Surface Measurements
Machining Shape
Radial Position Around Surface

FIG. 2

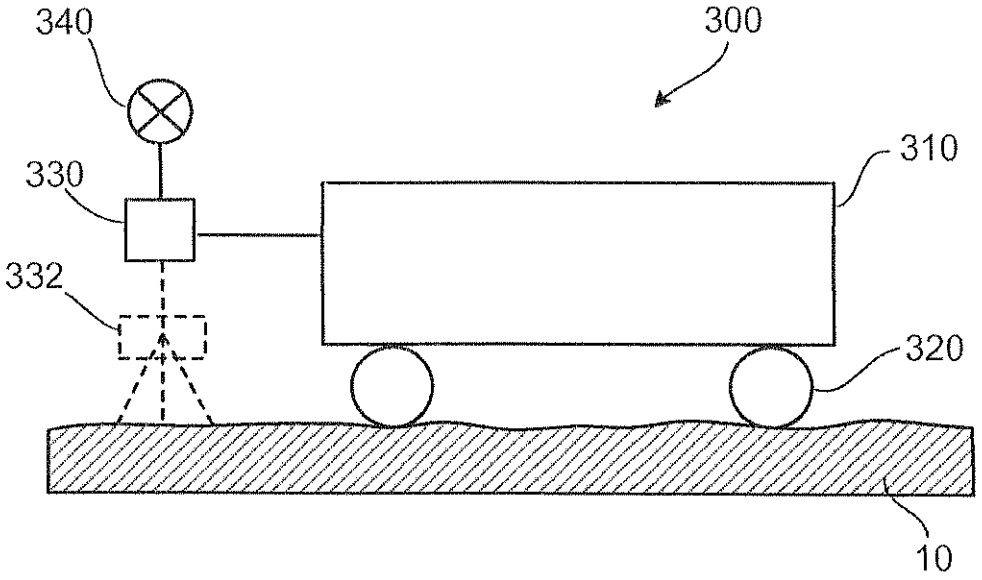



FIG. 3

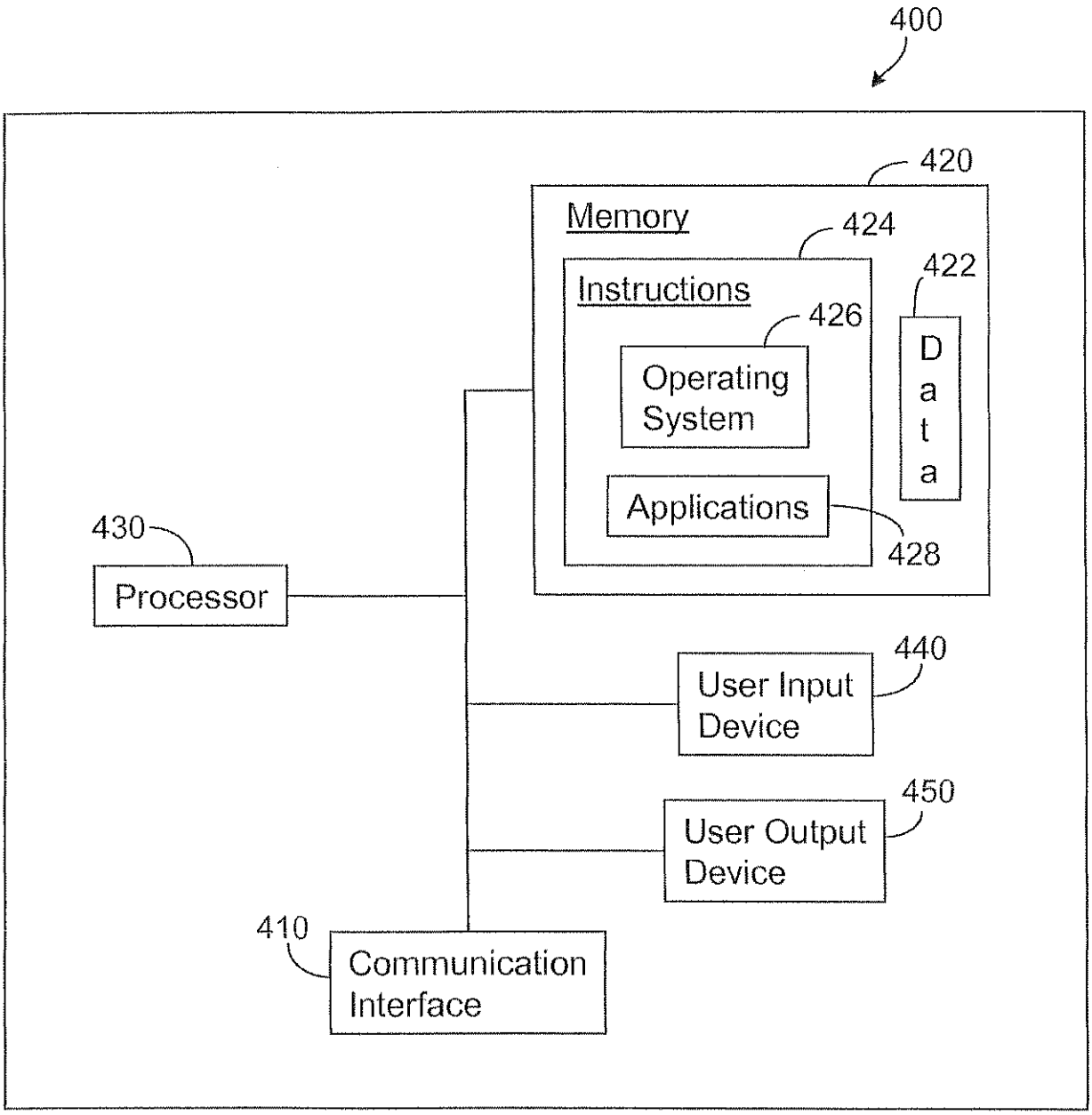

400
420
Memory
424
Instructions
422
426
Operating System
D a t a
Applications
428
430
Processor
440
User Input Device
450
User Output Device
410
Communication Interface

FIG. 4

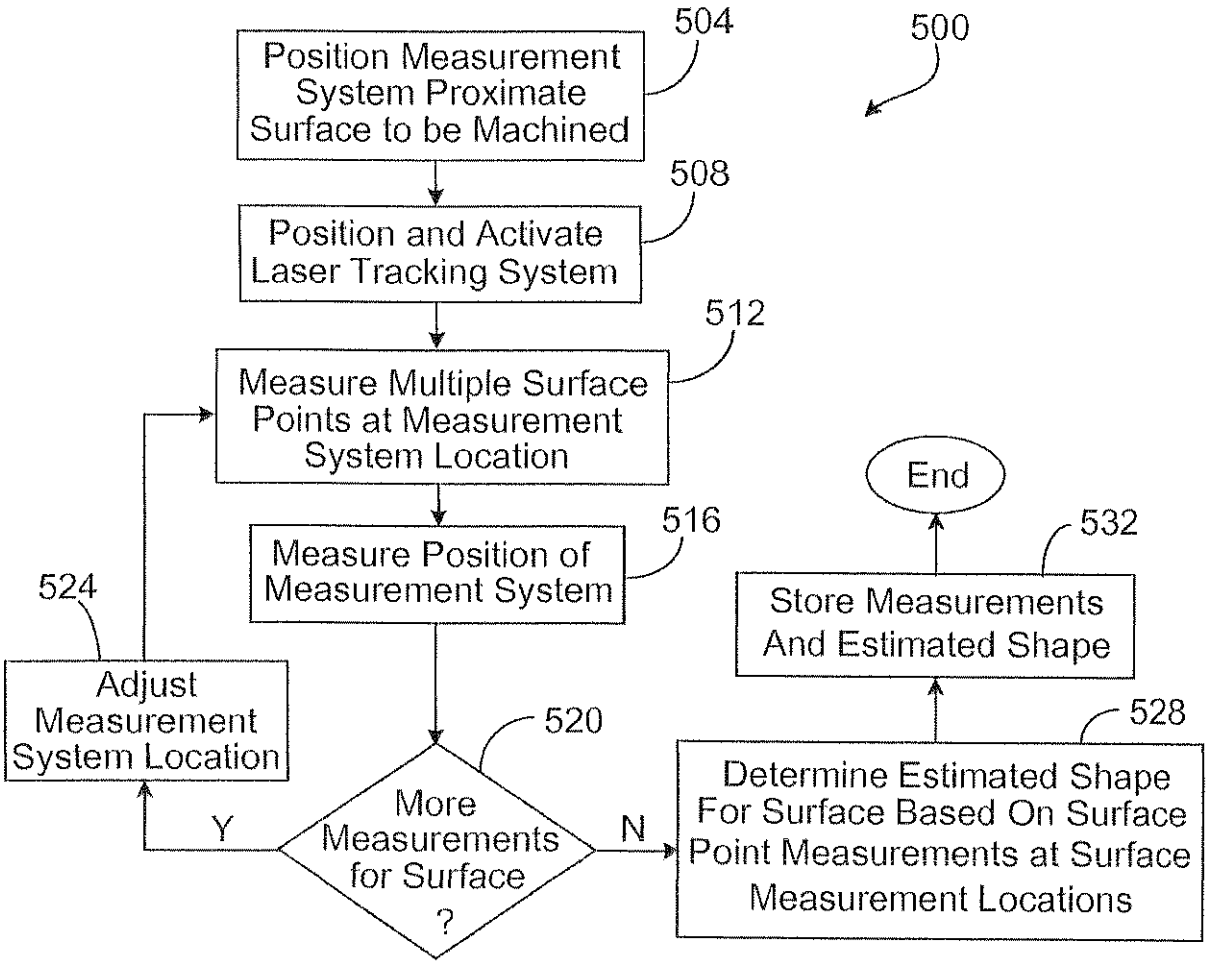

500
504
Position Measurement System Proximate Surface to be Machined
508
Position and Activate Laser Tracking System
512
Measure Multiple Surface Points at Measurement System Location
516
Measure Position of Measurement System
520
More Measurements for Surface ?
Y
N
524
Adjust Measurement System Location
528
Determine Estimated Shape For Surface Based On Surface Point Measurements at Surface Measurement Locations
532
Store Measurements And Estimated Shape
End

FIG. 5

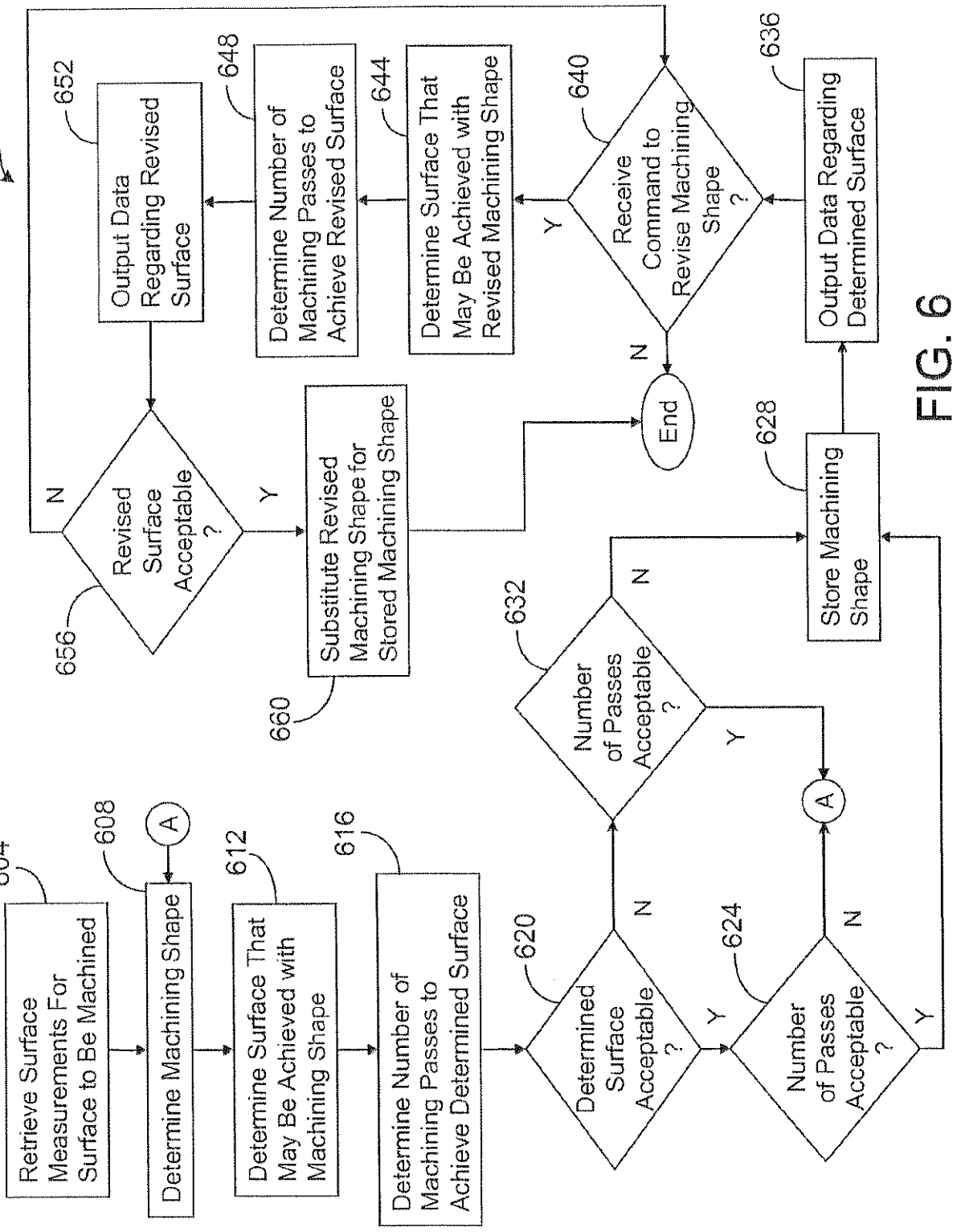

Retrieve Surface Measurements For Surface to Be Machined
604
Determine Machining Shape
608
A
Determine Surface That May Be Achieved with Machining Shape
612
Determine Number of Machining Passes to Achieve Determined Surface
616
Determined Surface Acceptable ?
620
N
Y
Number of Passes Acceptable ?
624
N
A
Y
Number of Passes Acceptable ?
632
N
Y
Store Machining Shape
628
Output Data Regarding Determined Surface
636
Receive Command to Revise Machining Shape ?
640
Y
N
End
Determine Surface That May Be Achieved with Revised Machining Shape
644
Determine Number of Machining Passes to Achieve Revised Surface
648
Output Data Regarding Revised Surface
652
Revised Surface Acceptable ?
656
N
Y
Substitute Revised Machining Shape for Stored Machining Shape
660
656

FIG. 6

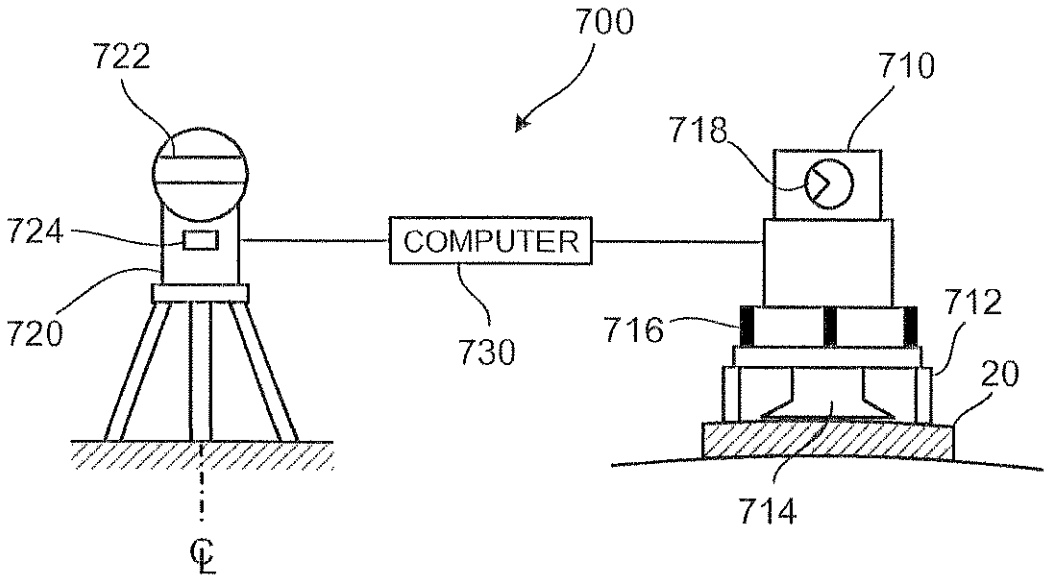



FIG. 7

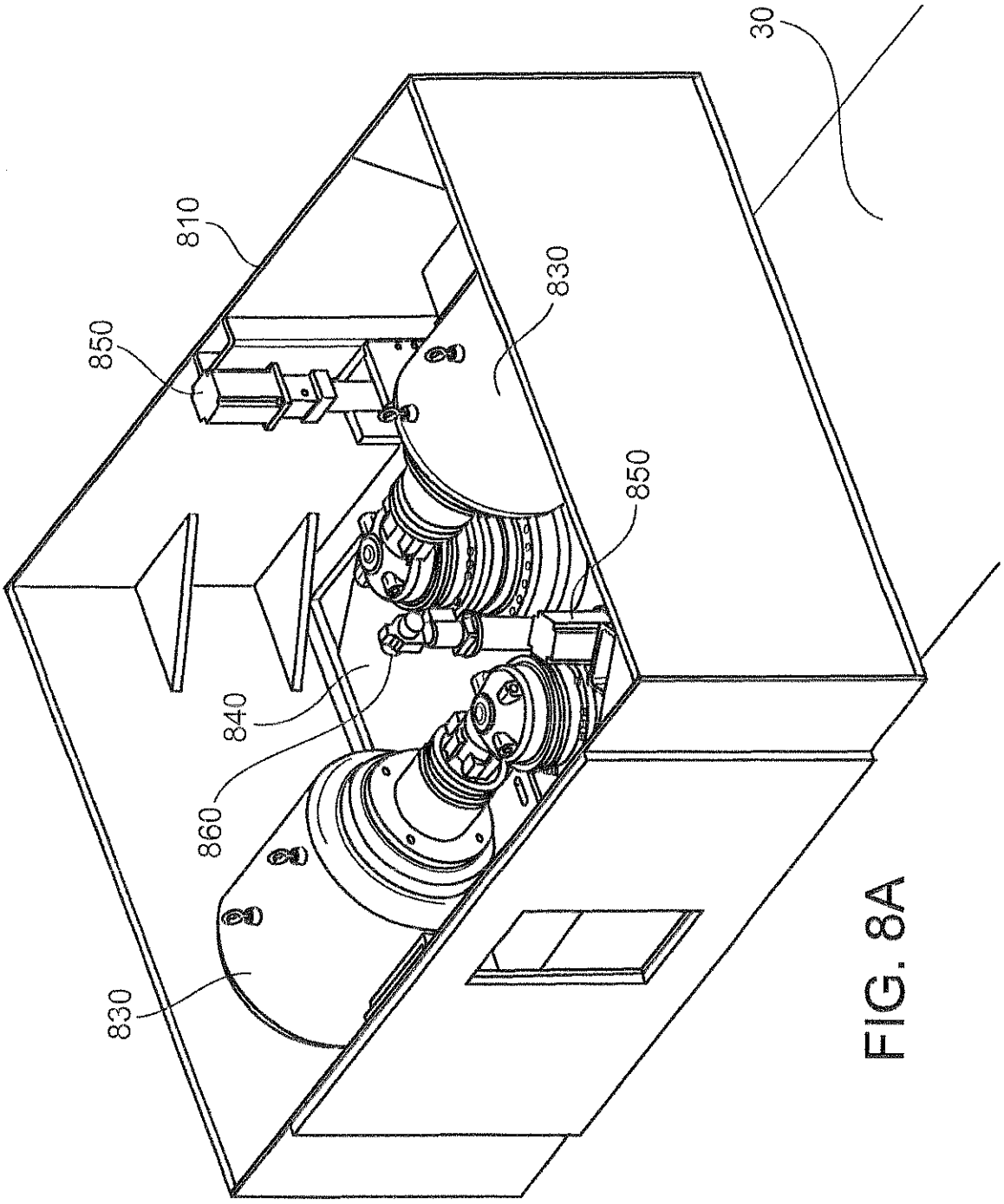



FIG. 8A

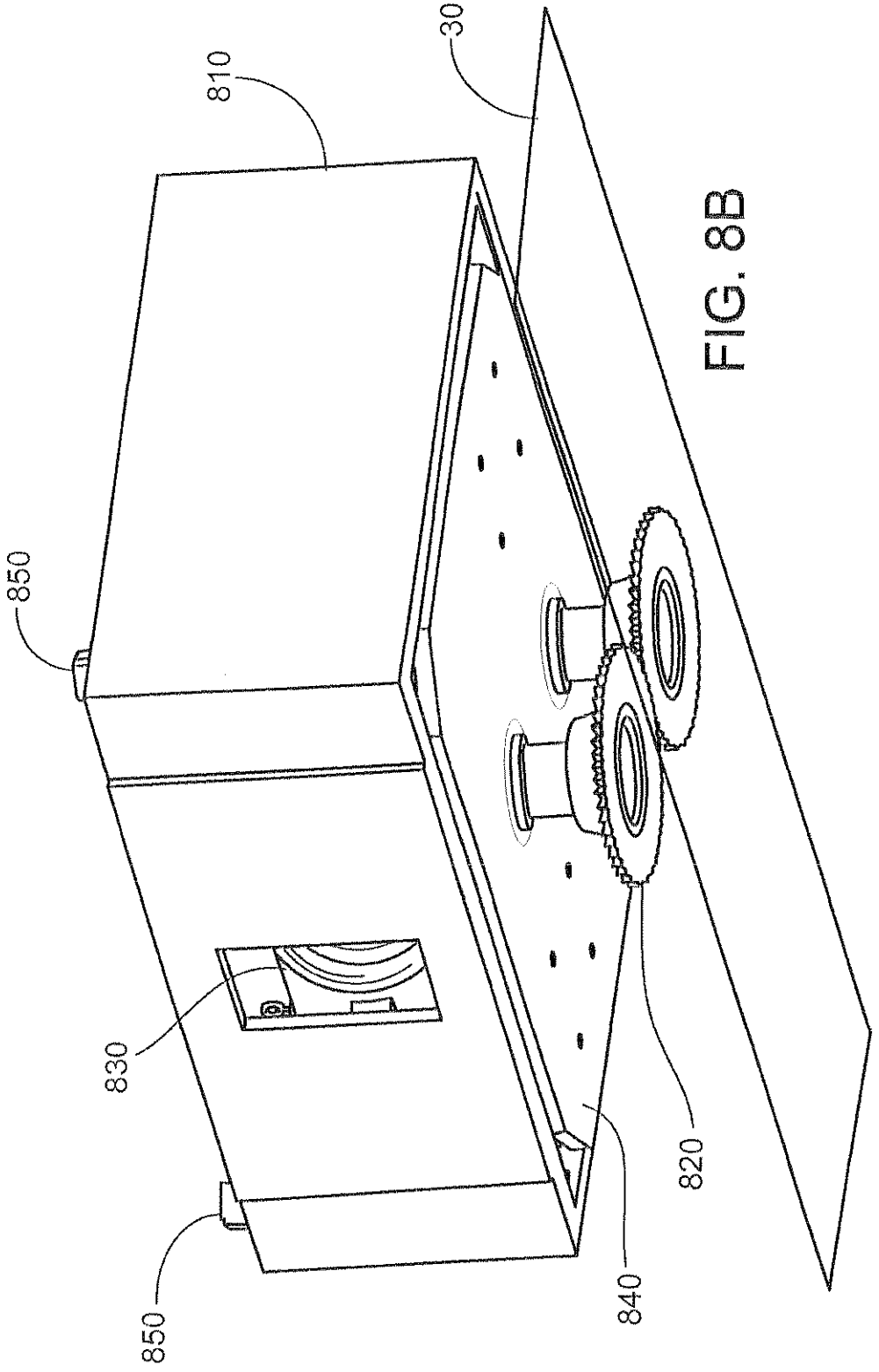



FIG. 8B

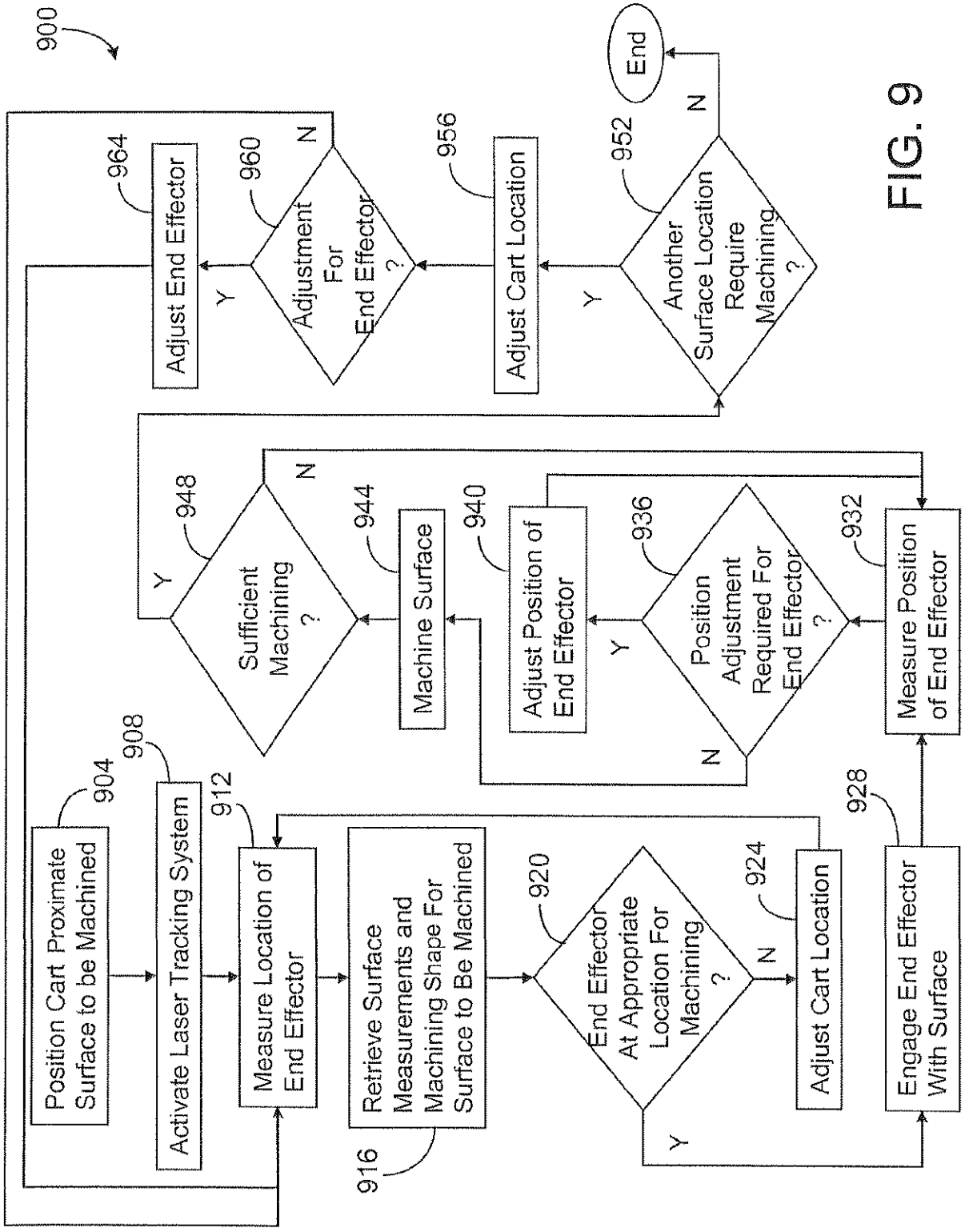

900
Position Cart Proximate Surface to be Machined
904
Activate Laser Tracking System
908
Measure Location of End Effector
912
Retrieve Surface Measurements and Machining Shape For Surface to Be Machined
916
End Effector At Appropriate Location For Machining ?
920
Y
N
Adjust Cart Location
924
Engage End Effector With Surface
928
Measure Position of End Effector
932
Position Adjustment Required For End Effector ?
936
Y
N
Adjust Position of End Effector
940
Machine Surface
944
Sufficient Machining ?
948
Y
N
Another Surface Location Require Machining ?
952
Y
N
Adjust Cart Location
956
Adjustment For End Effector ?
960
Y
N
Adjust End Effector
964
End

FIG. 9