

1/10

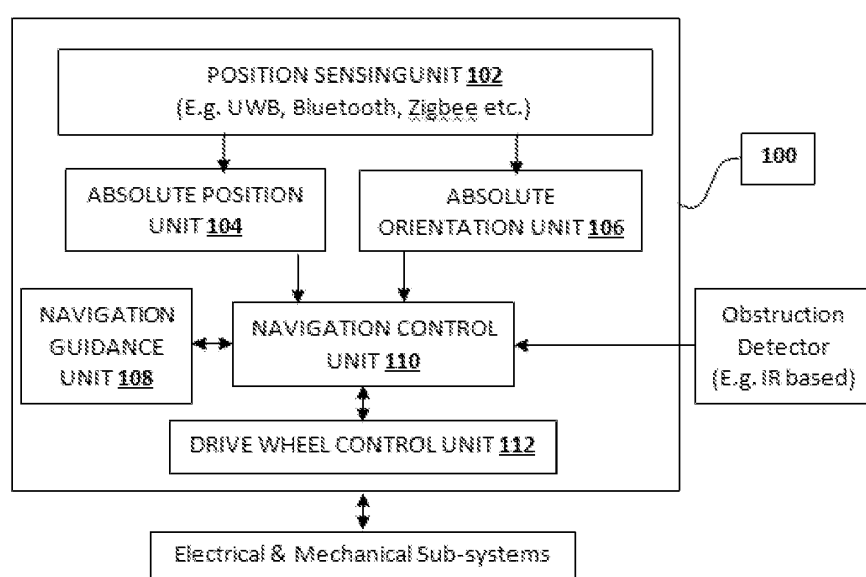


FIG.1

2/10

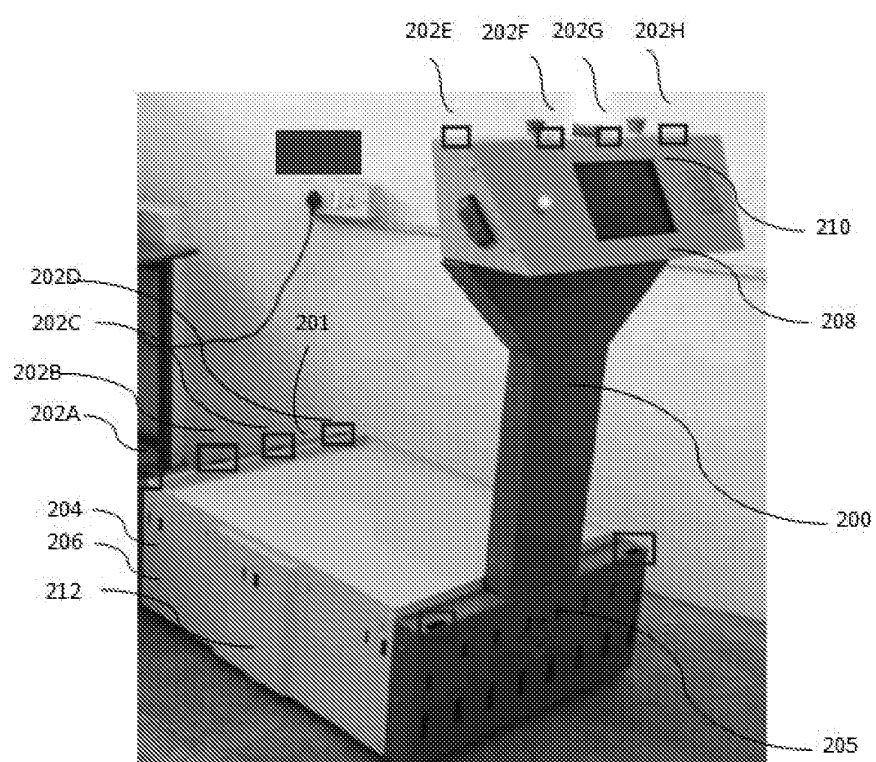


FIG.2A

3/10

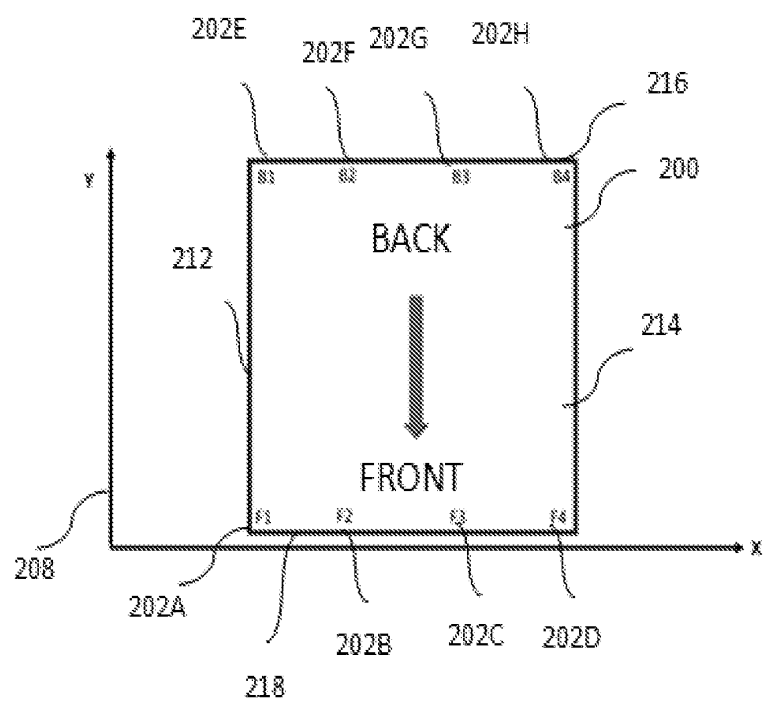


FIG. 2B

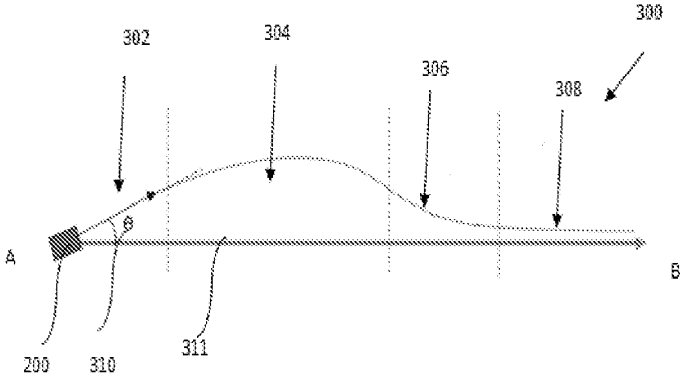


FIG.3A

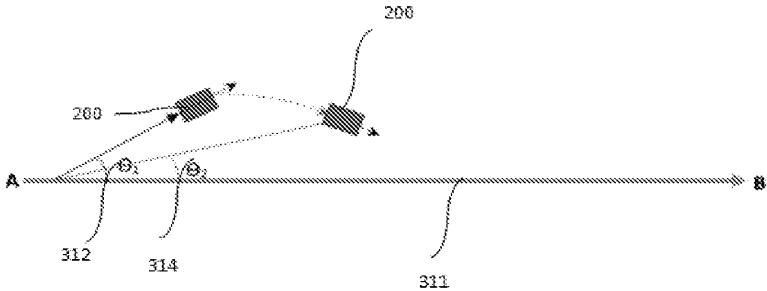


FIG.3B

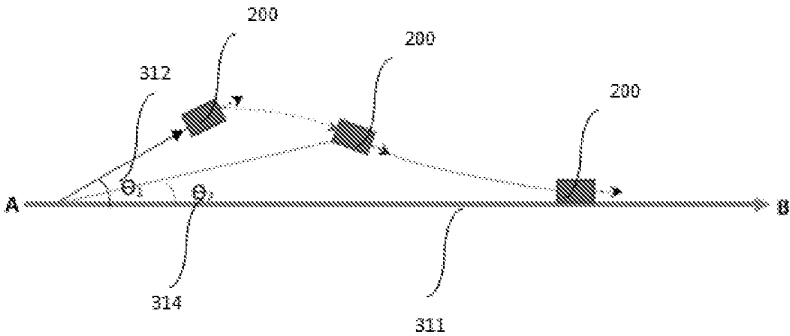


FIG.3C

5/10

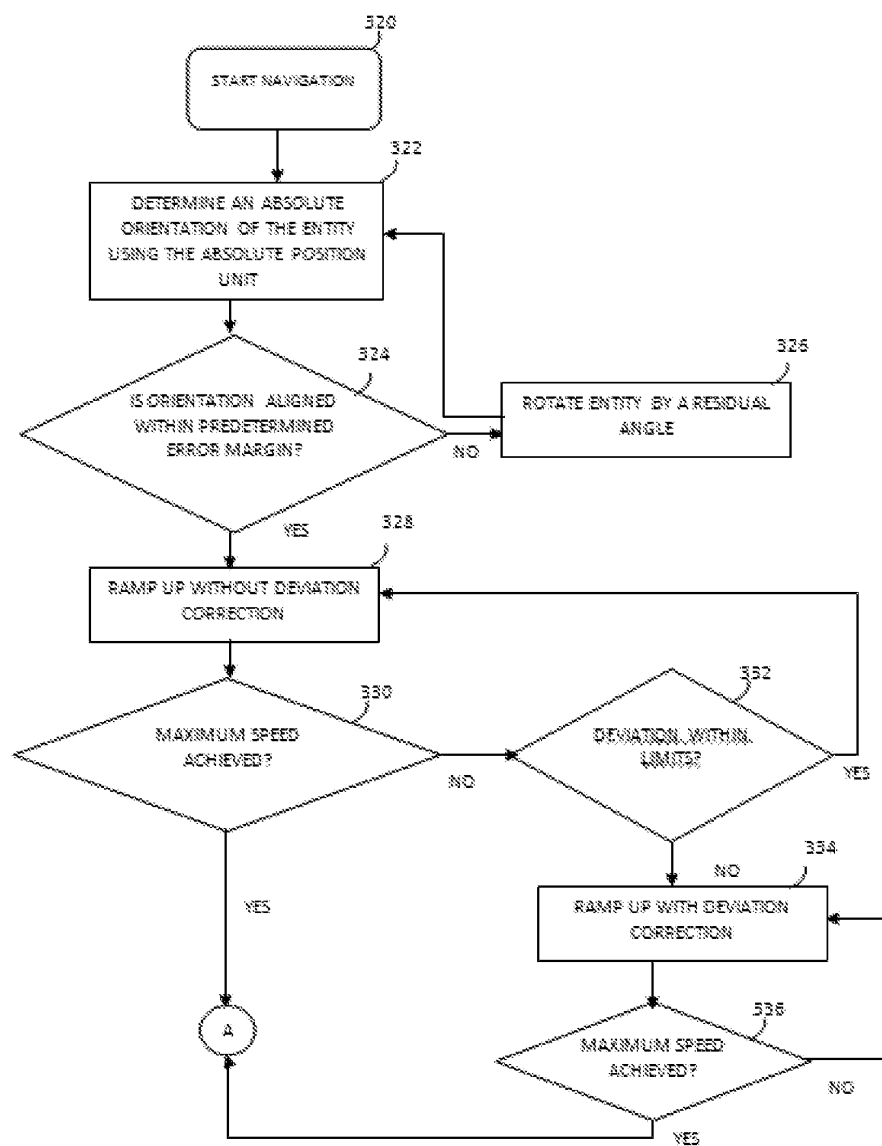


FIG.3D

6/10

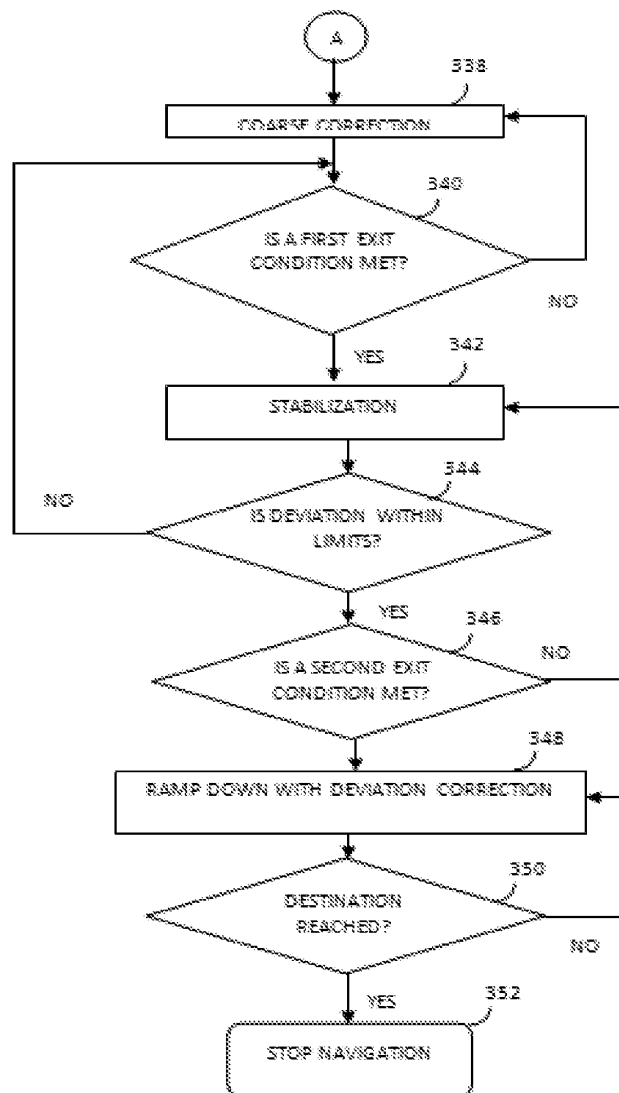


FIG.3E

7/10

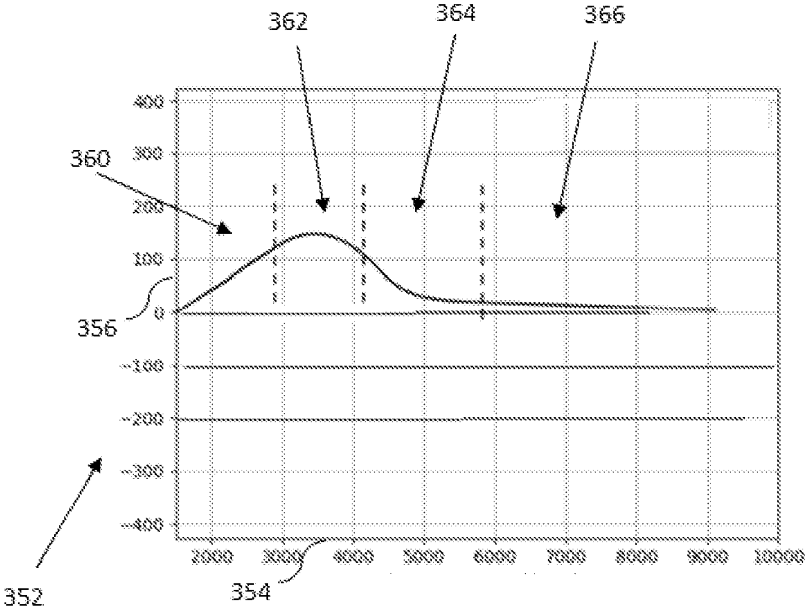


FIG. 3F

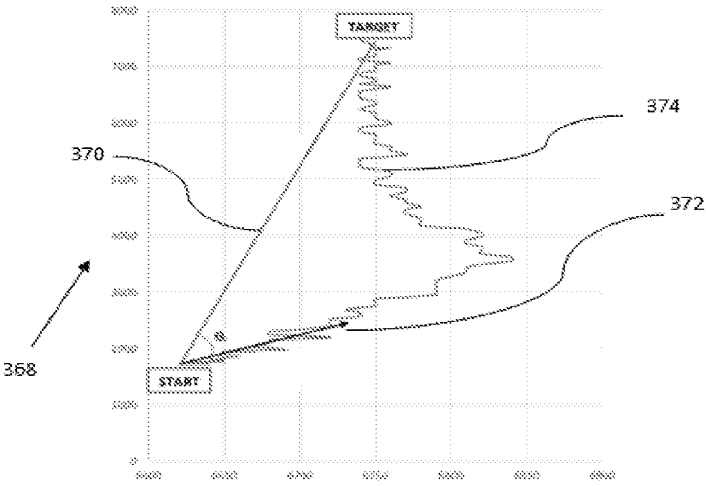


FIG. 3G

8/10

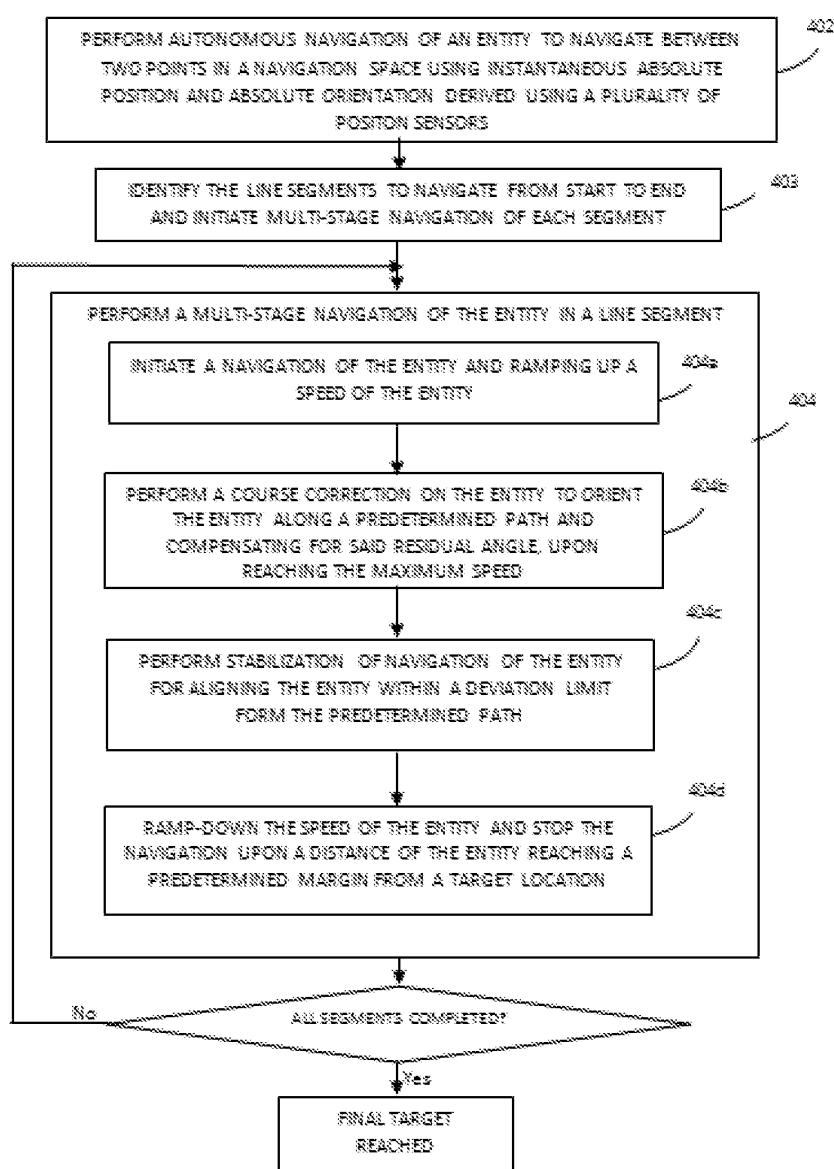
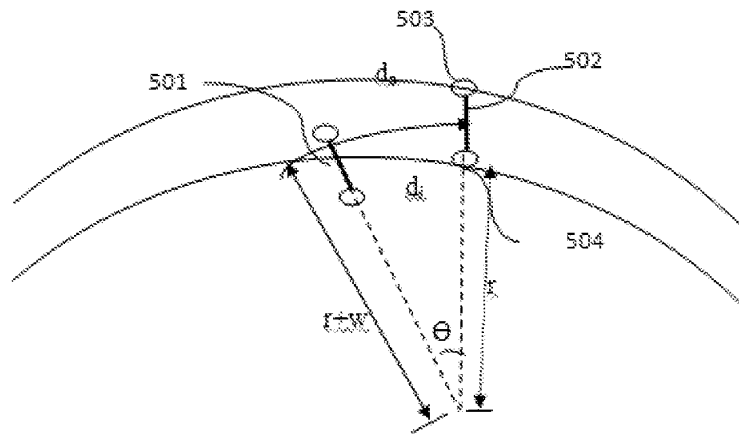


FIG.4

9/10



Angular displacement of the outer and the inner wheels are

$$d_o = (r+w) * \Theta; d_i = r * \Theta$$

At unit time, $S_{in} = d_i$ & $S_{out} = d_o$

where S_{in} is the speed of the inner wheel

S_{out} is the speed of the outer wheel

In effect, $S_{in} = S_{out} - w * \Theta$

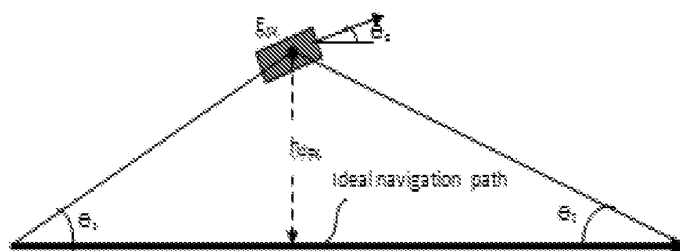
where ' w ' is the width of the entity (200),

' Θ ' is the desired angular correction to apply

Set the outer wheel (S_{out}) to current max speed and then derive the inner wheel speed (S_{in})

FIG.5

10/10



θ_s - Angle from start to the entity with respect to the ideal navigation path

θ_t - Angle from target to the entity with respect to the ideal navigation path

θ_e - Instantaneous absolute orientation of the entity

E_{xy} - Instantaneous absolute position of the entity

h_{dev} - Deviation of the entity from the ideal navigation path

Angular correction factor = $f(\theta_s, \theta_t, \theta_e, h_{dev}, E_{xy})$

The ~~weightage~~ as well as the usage of these parameters vary across different stages of multi-stage navigation.

One such typical application of these factors:

Course correction stage: Angular correction factor = $-K_c * \theta_s$

Stabilization stage: Angular correction factor = $\delta * K_s * (\theta_s + \theta_t)$

Ramp-down stage: Angular correction factor = $(K_d * h_{dev}) * \delta * K_r * (\theta_s + \theta_t)$

where,

K_c, K_s, K_r & K_d are scale factors fine-tuned for a given mechanical design

δ is the sign factor which is toggled depending up on entity's position w.r. to the ideal path

FIG.6