L [mm]. The height from an upper surface 30a of the traveling path 30 to a irradiation source O (the point from which the detection light J is irradiated) of the distance measuring sensor 11 is a height H [mm]. However, the height H may change due to vibration or the like during the traveling of the vehicle 2. An angle interval of each detection light J that is irradiated from the distance measuring sensor 11 is set to be an angle θ [rad]. This angle θ is a known value that is determined by the mechanical structure and setting of the distance measuring sensor 11.

The position in the track width direction of an irradiation spot of the detection light J that is irradiated vertically downward (in the −Z direction) from the irradiation source O of the distance measuring sensor 11 is set to be a sensor center position P1, and the spot number of the irradiation spot is determined to be the "0th". The edge position detection unit 1001 specifies the spot number (mth) of the irradiation spot closest to the edge e on the +Y direction side from the 0th irradiation spot, and the spot number (nth) of the irradiation spot closest to the edge e on the −Y direction side from the 0th irradiation spot.

[0040]

A method of specifying the spot number (mth) of the

which the upper surface 30a of the traveling path 30 is irradiated with the detection light J), of the graph F, and specifies the spot numbers m and n corresponding to end portions of the region.

[0041]

Returned to Fig. 4 as a drawing for reference. When the edge position detection unit 1001 specifies the spot numbers m and n, then, the edge position detection unit 1001 calculates positions y1 and y2 of the edges e with respect to the sensor center position P1 by calculating Expression (1) by using the known height H, the angle θ, and the spot numbers m and n.

[0042]

[Expression 1]

$$y1=H\times\tan(n\times\theta)$$
$$y2=H\times\tan(m\times\theta) \quad \ldots (1)$$

[0043]

Next, the distance calculation unit 1002 calculates the distance (deviation D) between the sensor center position P1 and the traveling path center position P2 by calculating Expression (2) by using the positions y1 and y2 of the edges e detected by the edge position detection unit 1001 and the known width L.

[0044]

[Expression 2]

$$D=L/2-(L\times y1)/(y1+y2)$$
$$=L/2-(L\times H\times\tan(n\times\theta))/(H\times\tan(n\times\theta)+H\times\tan(m\times\theta))$$
$$=L/2-(L\times\tan(n\times\theta))/(\tan(n\times\theta)+\tan(m\times\theta)) \quad \ldots (2)$$

[0045]

The steering control unit 1003 outputs a control command toward the steering mechanism 12 such that the deviation D calculated by the distance calculation unit 1002 becomes small. In this way, steering is performed such that the sensor center position P1 in the track width direction (the ±Y direction) coincides with the traveling path center position P2. Here, the sensor center position P1 is regarded as the same position as the center position of the rubber tire 22 in the vehicle width direction. Therefore, the steering mechanism 12 is controlled such that the sensor center position P1 coincides with the traveling path center position P2, and thus the center position of the rubber tire 22 always coincides with the traveling path center position P2 during traveling.

[0046]

The steering system 1 according to the first embodiment has an aspect in which the distance measuring sensors 11 are mounted corresponding to the right and left rubber tires 22, respectively, and the deviation D is calculated with respect to the set of each of the right and left distance measuring sensors 11 and the traveling path 30. In this case, the steering control unit 1003 may

"jumping" occurs in a distance, from the distance measurement data acquired from the distance measuring sensor 11, and specifies the spot number m corresponding to the point. In this case, the edge position detection unit 1001 sets the spot number of the detection light J that is irradiated vertically downward from the irradiation source of each distance measuring sensor 11 to be the "0th".

The edge position detection unit 1001 specifies the position of the edge e, based on the spot number m. Specifically, the edge position detection unit 1001 calculates the position y1 of the edge e with respect to the distance measuring sensor 11, as shown in Fig. 11. The same expression (Expression (1)) as in the first embodiment can be used in a method of calculating the position y1.

Next, the distance calculation unit 1002 obtains the deviation D by using the position y1. Here, it is assumed that the distance calculation unit 1002 has a position target value y1* determined in advance as a target value of the position of the end portion (edge e) of the index part 34 with respect to the distance measuring sensor 11. Then, the distance calculation unit 1002 sets the deviation between the position target value y1* and the position y1 obtained by the edge position detection unit