CLAIMS

1. A marker system comprising:

a magnetic detection part provided to a vehicle to detect a magnetic marker laid in a road;

a position information acquisition part which acquires marker position information indicating a laying position of the magnetic marker;

a relative position estimation part which estimates a relative position of the vehicle by inertial navigation calculation; and

a positioning part which performs an arithmetic process for identifying a position of the vehicle, wherein

the positioning part is configured so that when the magnetic detection part detects the magnetic marker, the positioning part identifies the position of the vehicle based on a laying position indicated by a corresponding piece of the marker position information, and

after passage over any said magnetic marker, the positioning part identifies the position of the vehicle based on the relative position of the vehicle estimated by the relative position estimation part with reference to the position of the vehicle identified when the magnetic marker is detected, and

the relative position estimation part estimates the relative position of the vehicle by using an azimuth of the vehicle identified by, in response to detection of at least two said magnetic markers arranged in a marker span indicating a predetermined space along a direction of which an absolute azimuth is known, using lateral shift amounts with respect to said at least two magnetic markers and a length of the marker span to identify an angular deviation of the azimuth of the vehicle with respect to the known direction.

2. The marker system in claim 1, wherein a combination of magnetic polarities of said at least two magnetic markers represents a direction which said at least two magnetic markers are along.

3. A marker system comprising:

a magnetic detection part provided to a vehicle to detect a magnetic marker laid in a road;

a position information acquisition part which acquires marker position information indicating a laying position of the magnetic marker;

a relative position estimation part which estimates a relative position of the vehicle by inertial navigation calculation; and

a positioning part which performs an arithmetic process for identifying a position of the vehicle, wherein

the positioning part is configured so that when the magnetic detection part detects the magnetic marker, the positioning part identifies the position of the vehicle based on a laying position indicated by a corresponding piece of the marker position information, and

after passage over any said magnetic marker, the positioning part identifies the position of the vehicle based on the relative position of the vehicle estimated by the relative position estimation part with reference to the position of the vehicle identified when the magnetic marker is detected, and

the relative position estimation part is capable of estimating a vehicle speed by integrating acceleration acting on the vehicle, and

the relative position estimation part identifies an estimation error of the vehicle speed by using a vehicle speed identified, in response to detection of at least two magnetic

markers arranged in a marker span indicating a predetermined space along a direction of which an absolute azimuth is known, based on time required for passage over said at least two magnetic markers, and estimates the relative position of the vehicle by arithmetic process of reducing the estimation error of the vehicle speed.

4. The marker system in claim 1 or 2, wherein the relative position estimation part is capable of estimating a vehicle speed by integrating acceleration acting on the vehicle, and

the relative position estimation part identifies an estimation error of the vehicle speed by using a vehicle speed identified, in response to detection of said at least two magnetic markers, based on time required for passage over said at least two magnetic markers, and estimates the relative position of the vehicle by arithmetic process of reducing the estimation error of the vehicle speed.

5. A marker system comprising:

a magnetic detection part provided to a vehicle to detect a magnetic marker laid in a road;

a position information acquisition part which acquires marker position information indicating a laying position of the magnetic marker;

a relative position estimation part which estimates a relative position of the vehicle by inertial navigation calculation; and

a positioning part which performs an arithmetic process for identifying a position of the vehicle, wherein

the positioning part is configured so that when the magnetic detection part detects the magnetic marker, the positioning part identifies the position of the vehicle based on

a laying position indicated by a corresponding piece of the marker position information, and

after passage over any said magnetic marker, the positioning part identifies the position of the vehicle based on the relative position of the vehicle estimated by the relative position estimation part with reference to the position of the vehicle identified when the magnetic marker is detected, and

the relative position estimation part uses a positional shift between a first vehicle position identified when a first magnetic marker is detected and a second vehicle position identified when a second magnetic marker is detected to identify an estimation error of the relative position with reference to the first vehicle position, and

after passage over the second magnetic marker, estimates the relative position of the vehicle with reference to the second vehicle position by an arithmetic process of suppressing the estimation error of the relative position.

6. The marker system in any one of claims 1 to 5, wherein the position information acquisition part receives the marker position information wirelessly transmitted by a communication unit provided correspondingly to the magnetic marker.

7. The marker system in claim 6, wherein the position information acquisition part wirelessly supplies electric power to a wireless tag retained by the magnetic marker as the communication unit, and receives the marker position information wirelessly transmitted by the wireless tag in response to operation.

8. The marker system in any one of claims 1 to 7, wherein the system includes a storage part which stores the marker position

information, and

the position information acquisition part acquires marker position information indicating a laying position of the magnetic marker detected by the magnetic detection part by referring to information stored in the storage part.