DESCRIPTION

TITLE OF INVENTION

INSTALLATION DEVICE, INSTALLATION METHOD, AND INSTALLATION SYSTEM

TECHNICAL FIELD

[0001] The present invention relates to an installation device for laying a magnetic marker in a road.

BACKGROUND ART

[0002] Conventionally, vehicular marker detection systems for detecting a magnetic marker laid in a road by a magnetic sensor attached to a vehicle have been known (for example, refer to Patent Literature 1). According to this marker detection system, various driving assists, such as automatic steering control, lane departure warning, and automatic driving using magnetic markers laid along a lane, can be achieved.

CITATION LIST

PATENT LITERATURE

[0003] Patent Literature 1: Japanese Unexamined Patent Application Publication No. 2005-202478

SUMMARY OF INVENTION

TECHNICAL PROBLEM

[0004] However, the above-described conventional magnetic marker has the following problem. For example, to achieve driving assist such as lane departure warning, it is required to lay many magnetic markers at relatively short spacing with high position accuracy, thereby posing a problem in which installation cost tends to increase.

CLAIMS

1. An installation device for laying a magnetic marker in a road, comprising:

an operation unit which provides a laying position for the magnetic marker~~, wherein~~ in the road;

an azimuth measurement unit which measures an azimuth in a predetermined direction set in advance in the installation device; and

a position-measurement unit which measures a position of a position-measurement location whose position relation with the operation unit is known, wherein

the installation device is capable of providing the laying position for the magnetic marker at each of a plurality of locations without moving, the plurality of locations having a predetermined relative position relation~~.~~, and is capable of identifying, as a position of the laying position to be provided by the operation unit, a position shifted by an offset amount identified by the position relation between the operation unit and the position-measurement location from the measured position of the position-measurement location along a direction determined based on the azimuth measured by the azimuth measurement unit which measures the azimuth.

2. The installation device in claim 1, wherein the installation device comprises a plurality of the operation units and, in the installation device, each of a plurality of the operation units is arranged for each of a plurality of the laying positions for a plurality of the magnetic markers at the plurality of locations.

3. The installation device in claim 1 or 2, ~~wherein the~~

~~installation device is provided with a position-measurement location where a relative position relation with the operation unit is identified, and comprises a position information acquisition unit for acquiring position information of the position-measurement location~~ comprising a hand push handle for an operator to operate, a unit which senses operation forces acting on the hand push handle, and driving wheels to be rotationally driven, and

the driving wheels are configured to be rotationally driven in response to the operation forces sensed by the unit which senses operation forces.

4. ~~The installation device in any one of claims 1 to 3, further comprising an azimuth information acquisition unit which acquires azimuth information for identifying an orientation of an arrangement shape of the plurality of the laying positions for the plurality of the magnetic markers at the plurality of locations.~~ An installation method of laying a magnetic marker in a road by using an installation device for the magnetic marker, wherein

the installation device includes an operation unit which provides a laying position for the magnetic marker in the road, and is capable of providing the laying position for the magnetic marker at each of a plurality of locations without moving, the plurality of locations having a predetermined relative position relation,

an azimuth in a predetermined direction set in advance in the installation device is measured, and a position of a position-measurement location whose position relation with the operation unit is known is measured, and

a position shifted by an offset amount identified by the position relation between the operation unit and the

position-measurement location from the measured position of the position-measurement location along a direction determined based on the measured azimuth in the predetermined direction is identified as a position of the laying position to be provided by the operation unit.

5. The installation method in claim 4, wherein the installation device comprises a plurality of the operation units and, in the installation device, each of a plurality of the operation units is arranged at each of a plurality of the laying positions for magnetic markers.

6. An installation system including an installation device for a magnetic marker to lay a magnetic marker in a road by using the installation device, comprising:

an operation unit included in the installation device to provide a laying position for the magnetic marker in the road;

an azimuth measurement unit which measures an azimuth in a predetermined direction set in advance in the installation device;

a position-measurement unit which measures a position of a position-measurement location whose position relation with the operation unit is known;

a storing unit which stores the position relation between the operation unit and the position-measurement location;

a position identifying unit which identifies a position of the laying position to be provided by the operation unit; and

a database which has stored and accumulated therein information indicating the position of the laying position identified by the position identifying unit which identifies the position, wherein

the installation device is configured to be able to provide

the laying position for the magnetic marker at each of a plurality of locations without moving, the plurality of locations having a predetermined relative position relation, and

the position identifying unit which identifies the position of the laying position is configured to identify, as the position of the laying position to be provided by the operation unit, a position shifted by an offset amount identified by the position relation between the operation unit and the position-measurement location from the measured position of the position-measurement location along a direction defined based on the azimuth measured by the azimuth measurement unit which measures the azimuth.

7. The installation system in claim 6, wherein the installation device comprises a plurality of the operation units and, in the installation device, each of the plurality of the operation units is arranged at each of a plurality of the laying positions for magnetic markers.