1, the direction of the magnetic field with respect to the magnetosensitive surfaces of the Hall devices changes. The Hall devices output electrical signals corresponding to the changed angle. The position of the vehicle 1 on the rail 2 is detected based on the values (voltage values) of the electrical signals. The first position detection sensor 12A and the second position detection sensor 12B are also disposed in positions which are opposed to magnets 3 on the rail 2 in the vehicle 1 and which are adjacent to the magnets 3. The first position detection sensor 12A and the second position detection sensor 12B output detection signals to the controller 13.

[0022]

The controller 13 determines whether the first motor 10A is located in an irregular section, on the basis of the detection signal from the first magnet absence detection sensor 11A. If the controller 13 determines that the first motor 10A is not located in any irregular section, it outputs, to the drive controller 14, a drive command instructing the drive controller 14 to drive the first motor 10A. In contrast, if the controller 13 determines that the first motor 10A is located in an irregular section, it outputs, to the drive controller 14, a drive command instructing the drive controller 14 to stop the drive of the first motor 10A. Similarly, the controller 13 determines whether the second motor 10B is located in an irregular section, on the basis of the detection signal from the second magnet absence detection sensor 11B. If the controller 13 determines that the second motor 10B is not located in any irregular section, it outputs, to the drive controller 14, a drive command instructing the drive controller 14 to drive the second motor 10B. In contrast, if the controller 13 determines that the second motor 10B is located in an irregular section, it outputs, to the drive controller 14, a drive command instructing the drive

controller 14 to stop the drive of the second motor 10B. As shown in Fig. 6, when the signal level of the drive command is high, the motor 10A or 10B is driven; when the signal level thereof is low, the motor 10A or 10B is stopped.

[0023]

Further, when the first position detection sensor 12A is located in a section other than an irregular section, the controller 13 determines the position of the vehicle 1 on the basis of the detection signal from the first position detection sensor 12A. In contrast, when the first position detection sensor 12A is located in an irregular section, the controller 13 determines the position of the vehicle 1 on the basis of the detection signal from the second position detection sensor 12B. Then, based on the determined position of the vehicle 1, the controller 13 outputs, to the drive controller 14, a position command instructing the drive controller 14 to move the vehicle 1 to a movement position.

[0024]

The drive controller 14 controls the drive or stop of the first motor 10A on the basis of the drive command related to the first motor 10A from the controller 13. The drive controller 14 also controls the drive or stop of the second motor 10B on the basis of the drive command related to the second motor 10B from the controller 13. The drive controller 14 also controls the drive of the first motor 10A and second motor 10B so that the vehicle 1 moves to the movement position, on the basis of the position command from the controller 13.

[0025]

While the first magnet absence detection sensor 11A and the first position detection sensor 12A are disposed in positions adjacent to the first motor 10A in the example shown in Fig. 1, these sensors need not necessarily be disposed in

signals, the controller 13 determines that one of the detection sensors 12A and 12B is located in an irregular section; and the controller 13 then determines which of the detection sensors 12A and 12B is located in the irregular section, from the traveling direction of the vehicle 1.

[0077]

When the first position detection sensor 12A is located in the irregular section as shown in Fig. 11 (YES in step S12), the controller 13 changes the position detection sensor used to determine the position of the vehicle 1 from the first position detection sensor 12A to the second position detection sensor 12B. At this time, the first position detection sensor 12A is located in the irregular section, whereas the second position detection sensor 12B is not located in the irregular section. Thus, the moving distance of the vehicle 1 can be determined using the second position detection sensor 12B. As shown Fig. 11, the length of an irregular section is shorter than the distance between the first position detection sensor 12A (the first position detector) and the second position detection sensor 12B (the second position detector) in the moving direction of the vehicle 1.

[0078]

As described above, the controller 13 determines the moving distance in the irregular section, of the vehicle 1 on the basis of the detection signal from the second position detection sensor 12B (step S13) and determines the current position of the vehicle 1 from the moving distance in the irregular section, of the vehicle 1 (step S14). Specifically, the controller 13 determines the number of magnets 3 through which the vehicle 1 has passed, by counting (that is, incrementing) changes in the detection signal from the second position detection sensor 12B and thus determines the moving distance of the vehicle 1; and the controller 13 then determines the position of the vehicle 1 by adding the moving

11B) include photosensors in the above embodiment, these detectors may include magnetic pole detection sensors using Hall devices in place of photosensors. In this case, the Hall device of each magnetic pole detection sensor detects an irregular section by detecting the distortion (disturbance) of the magnetic field in the irregular section. The detectors 11A and 11B thus configured can more reliably detect an irregular section on the basis of the distortion of the magnetic field. The detectors 11A and 11B may also be contact-type measuring instruments (e.g., measuring instruments using probes).

[0092]

While the position detectors 12A and 12B (first position detection sensor 12A, second position detection sensor 12B) include magnetic pole detection sensors for detecting the magnetic pole in the above embodiment, these detectors may be composed of photosensors in place of magnetic pole detection sensors. While the controller 13 determines the positions of magnets 3 by incrementing the detection signal from the position detector 12A or 12B and then determines the position of the vehicle 1, other configurations may be employed. For example, the position detector 12A or 12B may detect the absolute value of the moving distance of the vehicle 1, and the controller 13 may determine the position of the vehicle 1 on the basis of the absolute value of the moving distance of the vehicle 1 detected by the position detector 12A or 12B. Further, the absolute value (absolute position) of the moving distance of the vehicle 1 may be detected using an encoder or the like.

[0093]

In the above embodiment, the first magnet absence detection sensor 11A and second magnet absence detection sensor 11B detect the presence or absence of a magnet 3 in an irregular section, and the first position detection sensor 12A and second position detection sensor 12B detect the position of the vehicle 1. Alternatively, one set of detection sensors

Claims

1. A position detection device for detecting a position of a moving body moving on a movement path on which magnets with south poles and magnets with north poles are alternately disposed, the device comprising:

a first position detector disposed in the moving body and configured to detect the position of the moving body by detecting poles of the magnets;

a second position detector disposed in the moving body, disposed in a different position from a position of the first position detector in a moving direction of the moving body, and configured to detect the position of the moving body; and

a controller configured to determine the position of the moving body on a basis of a position detected by the second position detector when the first position detector is located in an irregular section in which the poles of the magnets are not disposed regularly,

wherein the irregular section is a section in which the magnets are not disposed,

and wherein when the first position detector is located in the irregular section, the controller determines a moving distance of the moving body in the irregular section on the basis of the position detected by the second position detector and determines the position of the moving body on the basis of the determined moving distance.

2. The position detection device of Claim 1, wherein the second position detector detects the position of the moving body by detecting the poles of the magnets.

3. The position detection device of Claim 1 or 2, wherein the controller determines that one of the first position detector and second position detector is located in the

irregular section, by comparing a position detected by the first position detector and the position detected by the second position detector.

4. The position detection device of any one of Claims 1 to 3, wherein the irregular section is shorter than a distance between the first position detector and the second position detector in the moving direction.

5. A method for detecting a position of a moving body moving on a movement path on which magnets with south poles and magnets with north poles are alternately disposed, the method comprising:

detecting, by a first position detector disposed in the moving body, the position of the moving body by detecting poles of the magnets;

detecting, by a second position detector disposed in the moving body and disposed in a different position from a position of the first position detector in a moving direction of the moving body, the position of the moving body; and

determining, by a controller, the position of the moving body on a basis of a position detected by the second position detector when the first position detector is located in an irregular section in which the poles of the magnets are not disposed regularly,

wherein when the first position detector is located in the irregular section, the controller determines a moving distance of the moving body in the irregular section on the basis of the position detected by the second position detector and determines the position of the moving body on the basis of the determined moving distance.

6. A moving body system comprising:

the position detection device of any one of Claims 1 to 4,

wherein the movement path on which magnets with south poles and magnets with north poles are alternately disposed; and

wherein the moving body is capable of moving along the movement path.

7. A position detection device for detecting a position of a moving body moving on a movement path on which magnets with south poles and magnets with north poles are alternately disposed, the device comprising:

a first position detector disposed in the moving body and configured to detect the position of the moving body by detecting poles of the magnets;

a second position detector disposed in the moving body, disposed in a different position from a position of the first position detector in a moving direction of the moving body, and configured to detect the position of the moving body; and

a controller configured to determine the position of the moving body on a basis of a position detected by the second position detector when the first position detector is located in an irregular section in which the poles of the magnets are not disposed regularly,

wherein the irregular section is a section in which the magnets with south poles and magnets with north poles are not alternately disposed, and

wherein when the first position detector is located in the irregular section, the controller determines a moving distance of the moving body in the irregular section on the basis of the position detected by the second position detector and determines the position of the moving body on the basis of the determined moving distance.

8. The position detection device of Claim 7, wherein the second position detector detects the position of the moving

body by detecting the poles of the magnets.

9. The position detection device of Claim 7 or 8, wherein the controller determines that one of the first position detector and second position detector is located in the irregular section, by comparing a position detected by the first position detector and the position detected by the second position detector.

10. The position detection device of any one of Claims 7 to 9, wherein the irregular section is shorter than a distance between the first position detector and the second position detector in the moving direction.

11. A moving body system comprising:

the position detection device of any one of Claims 7 to 10,

wherein the movement path on which magnets with south poles and magnets with north poles are alternately disposed; and

wherein the moving body is capable of moving along the movement path.